



**REPORT OF SUPPLEMENTAL
REMEDIAL INVESTIGATION
L. E. CARPENTER FACILITY
WHARTON, NEW JERSEY
VOLUME I**

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Prepared for

L. E. Carpenter & Company

Prepared by

**Weston Services, Inc.
West Chester, Pennsylvania**

W.O. No. 8089-0005

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SECTION 1

INTRODUCTION

This Supplemental Remedial Investigation report presents the findings and conclusions of sampling efforts conducted in August 1990 to further delineate soil contamination at the L.E. Carpenter facility in Wharton, New Jersey. The sampling efforts completed in August were designed to supplement data collected previously by Geoengineering, Inc. and reported by L.E. Carpenter and Company (L.E. Carpenter) and its consultants, Weston Services, Inc. (WSI), Roy F. Weston, Inc. (WESTON) and Geoengineering, Inc.

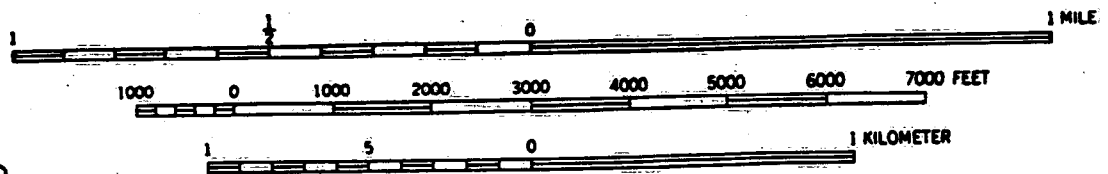
1.1 SITE DESCRIPTION

A detailed description of the site is provided in the "Revised Report of Remedial Investigation Findings" (GeoEngineering and WESTON, June 1990). The L.E. Carpenter site occupies approximately 14.6 acres in an industrial area of Wharton, New Jersey, as shown in Figure 1-1. The site is bounded on the south by the Rockaway River, on the east by a vacant lot owned by Wharton Enterprises, on the northeast by a compressed gas facility (Air Products, Inc.), on the northwest by Ross Street and a residential area, and on the west by Washington Forge Pond as shown in Figure 1-2. A drainage ditch drains a portion of the site, the Air Products property, and eventually discharges to the Rockaway River downstream of the site. The site is bordered by a security fence along North Main and Ross Streets, which separates it from the Air Products property.

The majority of the L.E. Carpenter property lies within the 100-year flood plain along the north bank of the Rockaway River. The average topographic slope of the site is approximately 1.2 percent in an easterly direction towards the drainage ditch. However, the



QUADRANGLE LOCATION



CONTOUR INTERVAL 20 FEET



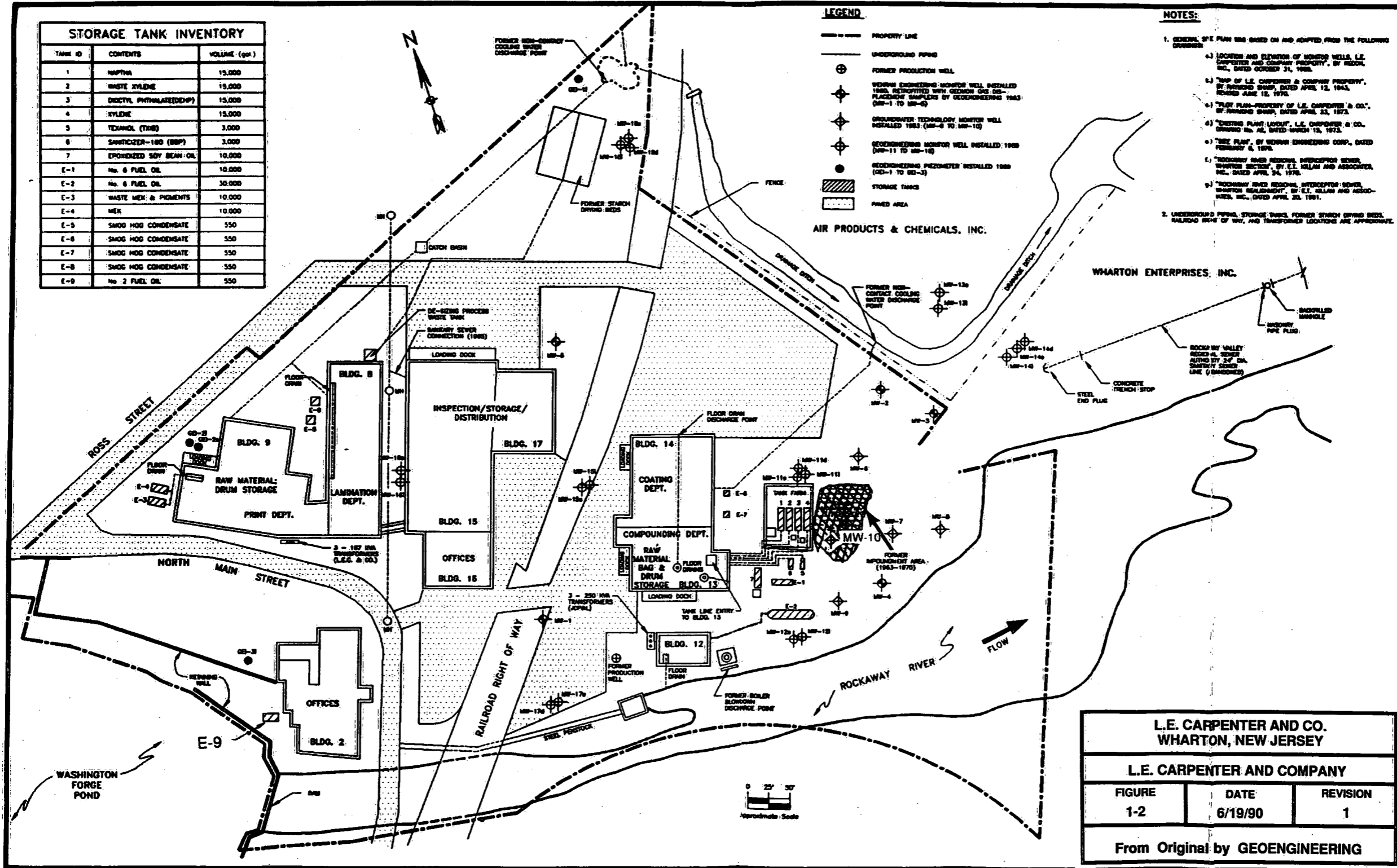
Approximate area of L.E. Carpenter Site



Western Services, Inc.

FIGURE 1-1 SITE LOCATION AND TOPOGRAPHIC MAP

STORAGE TANK INVENTORY		
Tank ID	CONTENTS	VOLUME (gal.)
1	NAFTA	15,000
2	WASTE XYLENE	15,000
3	DIOCTYL PHTHALATE(DOP)	15,000
4	XYLENE	15,000
5	TETRAOL (TIBS)	3,000
6	SANITIZER-100 (BWP)	3,000
7	EPONIZED SOY BEAN OIL	10,000
E-1	No. 6 FUEL OIL	10,000
E-2	No. 6 FUEL OIL	30,000
E-3	WASTE MEN & PIGMENTS	10,000
E-4	MER	10,000
E-5	SMOG HOG CONDENSATE	550
E-6	SMOG HOG CONDENSATE	550
E-7	SMOG HOG CONDENSATE	550
E-8	SMOG HOG CONDENSATE	550
E-9	No. 2 FUEL OIL	550



L.E. CARPENTER AND CO. WHARTON, NEW JERSEY		
L.E. CARPENTER AND COMPANY		
FIGURE	DATE	REVISION
1-2	6/19/90	1
From Original by GEOENGINEERING		



bedrock surface underlying the site forms a valley-like trough. The axis of this bedrock valley trends approximately east-southeast. The observed depth to bedrock ranges from 165 feet at monitoring well MW-11d near the former impoundment area to 46 feet at monitoring well MW-17d near the river. The bedrock is described as medium- to coarse-grained granite that exhibits some horizontal to near-vertical fractures.

The overlying unconsolidated sediment was deposited in a glaciofluvial and recent fluvial (e.g., flood plain) environment. The overburden is composed primarily of fairly uniform medium-to-coarse sand and fine-to-medium gravel. The soil near the surface contains a wider range of grain sizes from silt to boulders. A typical soil description is dark brown, fine-to-coarse sand, some fine-to-medium gravel, little silt, frequent cobbles and boulders. At some locations, near surface materials consist of fill that includes cinders, fly ash, gravel, asphalt, concrete, debris, and tailings from former mines in the area.

Based on the results of slug testing of on-site monitoring wells, the soil has a high permeability. The average hydraulic conductivity in the intermediate and deep zones of the aquifer is $1.8 \cdot 10^{-2}$ cm/sec. Based on hydraulic head data from on-site monitoring wells, groundwater at the site is generally 3 to 8 feet below the ground surface and flows to the east-northeast with a gradient of 0.003 ft/ft across the site. Shallow groundwater from much of the site and the majority of the surface water runoff discharges to the drainage ditch.

Groundwater in the vicinity of the site is not heavily used. A search performed by WESTON of well permits on file with NJDEP has tentatively identified two domestic wells and one irrigation well within 2,000 ft of the site boundary. The depths of these wells ranged from 88 to 120 ft. It is not known if these wells are still in use. Trichloroethylene (TCE) has been detected in two inactive public supply wells located 4,000 feet to the west of the site. However, TCE has not been detected in any of the on-site wells at L.E. Carpenter.



The site was formerly used as an iron ore mine and a forge during the 1800s. Tailings from these mines are thought to have been disposed on-site. The site was used by several textile businesses dating from the late 1800s. Between 1943 and June 1987, L.E. Carpenter manufactured vinyl wall covering at the site. Between 1963 and 1970, L.E. Carpenter disposed of waste materials, including polyvinyl chloride and cleaning solvent, in a surface impoundment on the southeastern portion of the site. Other significant operations and features include the tank farm, nine underground storage tanks, the de-sizing process waste tanks, and the former starch drying beds.

In January 1982, L.E. Carpenter and the NJDEP entered into an Administrative Consent Order (ACO) to remediate site contamination. On 26 September 1986, an amended ACO was adopted that required action at the site. The site was named to the National Priorities List (NPL) in July 1987. Currently, portions of the site are rented to several tenant businesses.

1.2 SITE REMEDIATION ACTIVITIES

Several site clean-up activities have already been implemented. In 1982, L.E. Carpenter removed 3,500 cubic yards of sludge and soil from the surface impoundment. Since May 1984, L.E. Carpenter has recovered more than 4,700 gallons of floating product from the water table surface on the eastern side of the site. The floating product has been characterized as approximately 99 percent xylene. Operation of the skimmer pumps in monitoring wells MW-6, MW-10, and MW-11s will continue during the FS as long as floating product recovery is feasible.

All drummed raw materials have been removed from the site with the exception of approximately 175 drums of a fragrance raw material in Building 13. The contents of most of the storage tanks have been removed. The removal of the tanks and the remaining contents is proceeding under an accelerated schedule separate from the remedial actions covered in this report.



SECTION 2

FINDINGS OF THE REMEDIAL INVESTIGATION

The RI field effort was initiated in February 1989. The Draft Report of RI Findings was completed in November 1989, and the Revised Report of RI Findings was submitted to NJDEP in June 1990.

The primary focus of the RI was the determination of the extent of contamination related to the former on-site waste impoundment. The investigation also encompassed the impact of waste disposal practices and other site activities on soil, groundwater, surface water, stream sediments, and air.

The soil gas survey indicated the presence of ethylbenzene, xylene, and toluene over much of the site, and naphtha-related compounds were detected in several areas. These data were used to identify test pit and hand-auger sampling locations.

The soil investigation indicated base neutral (BN) contamination in the area of the former impoundment and tank farm, starch drying beds, and condensate tanks from the "Smog Hog" air pollution control system (labeled E-5 through E-8 on Plate 1, back pocket). The predominant base neutral compounds detected were phthalates and polynuclear aromatic hydrocarbons (PAHs). The compound detected at the highest concentration was bis(2-ethylhexyl)phthalate, a plasticizer. The soil investigation confirmed contamination with volatile organic compounds (VOCs), primarily ethylbenzene and xylene, in the vicinity of the former impoundment and tank farm. Low levels of a polychlorinated biphenyl (PCB), Aurochlor 1254, were detected in soils on the Wharton Enterprises property and in the area of the former starch drying beds. The source of the PCBs detected on the Wharton property is not known and may be attributable to an off-site source.



Groundwater sampling found that contaminants were located primarily in the shallow water table. Floating product was detected in an area stretching from near Building 13 to the northeastern boundary of the site and in monitoring well MW-1. Xylene and ethylbenzene were detected in many of the monitoring wells in these areas. The VOCs in this area were attributed to past leakage from the tank farm area and from the coating line in Building 14. Pesticides and PCBs were not detected. TCL metals were found to be below New Jersey groundwater criteria.

Two monitoring well clusters installed on the Air Products property and the Wharton Enterprises property downgradient of the former impoundment and tank farm areas did not indicate the presence of VOCs from the site in the groundwater. BN compounds were detected in the shallow monitoring well, MW-14s, on the Wharton Enterprises property.

Surface water samples collected from the river, the drainage ditch, and Washington Forge Pond did not contain elevated levels of VOCs, BN compounds, or metals, except a sample from the drainage ditch on the Air Products property that contained low levels of xylene. Sediments from the river and the drainage ditch contained BN compounds (primarily phthalates and PAHs) and elevated levels of metals.

Analyses of monthly ambient air samples collected from four locations across the site between February and November 1989 did not detect levels of VOCs or metals in excess of OSHA-permissible exposure levels.



SECTION 3

SUPPLEMENTAL SAMPLING FINDINGS

3.1 INTRODUCTION

In the "Supplemental Sampling Plan, L.E. Carpenter Facility, Wharton, Morris County, New Jersey" (WESTON Services Inc., July 1990) four areas of environmental concern (AEC) were defined, as shown in Figure 3-1, and supplemental sampling was proposed. These areas were defined based on a review of the Revised Report of Remedial Investigation Findings (GeoEngineering and WESTON, June 1990), historical documents, interviews with present and former employees, a site inspection, review of geologic/hydrologic data in the vicinity, and the interpretation of historical aerial photographs.

The following subsections describe the results of the supplemental sampling in each area of environmental concern. The sampling strategy, methods of sample collection, and analytical parameter are presented in the Supplemental Sampling Plan (Weston Services Inc., July 1990). Table 3-1 provides a summary of supplemental sampling activity completed in August 1990. The laboratory data package for all these samples is included in Volumes II through VIII of this report.

3.2 STARCH DRYING BED - SUBSURFACE DISPOSAL SYSTEM (AEC-A)

3.2.1 Overview

Wastewater from the "desizing" process was pumped from the desizing waste tank just north of Building 8 to the subsurface disposal beds to the northeast where the mixture was subjected to microbial activity to remove the starch. These disposal beds were designated AEC-A in the Supplemental Sampling Plan (Weston Services, July 1990). Two test pits were constructed during the Remedial Investigation (RI) to assess the potential contamination originating from the starch drying beds. One test pit, TP-50, showed PCB concentrations up to 2,900 μg .

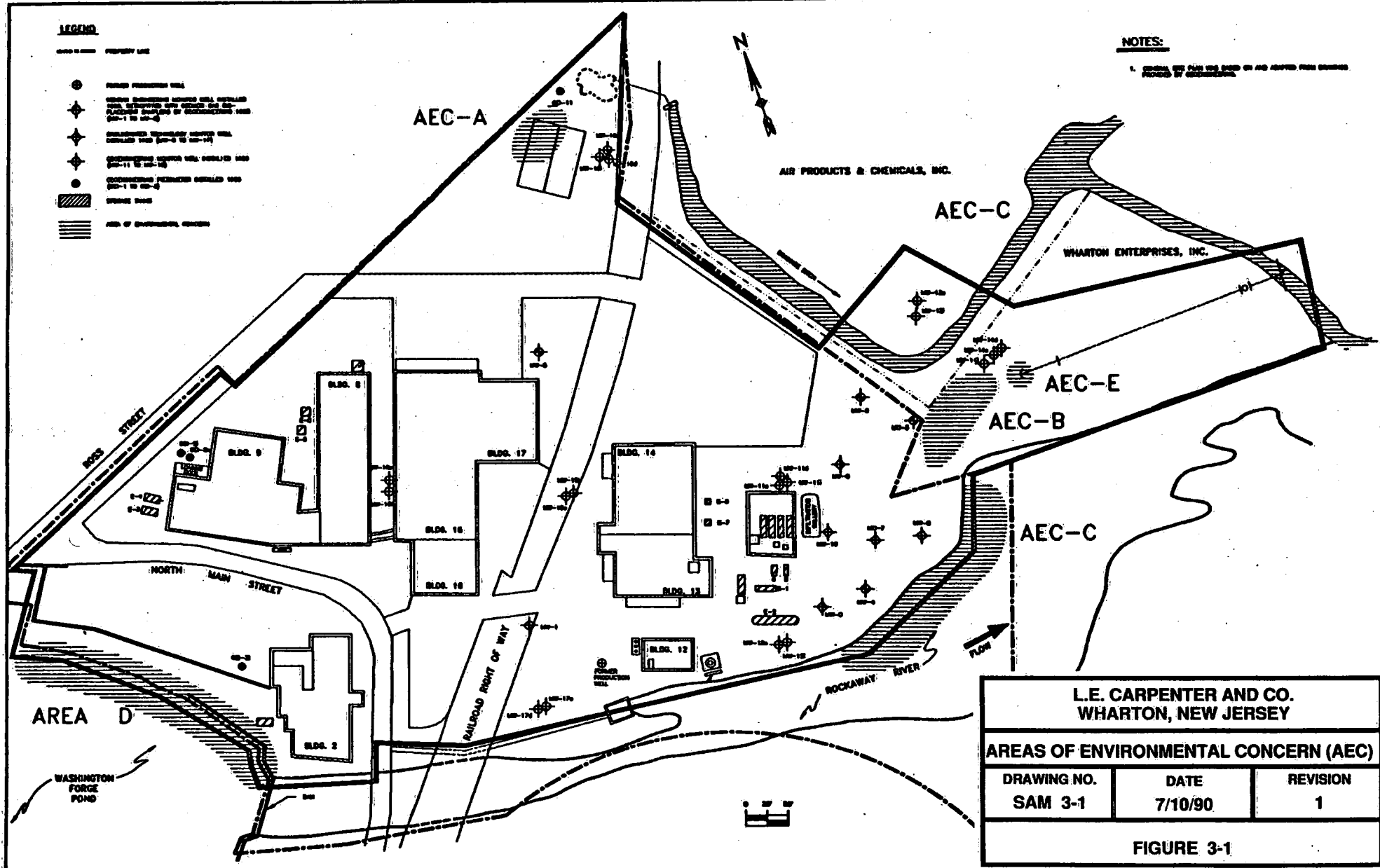
LEGEND

--- PROPERTY LINE

- FENCED PROHIBITION ZONE
- ◆ FENCED PROHIBITION ZONE WITH HAZARDOUS WASTE, UNIDENTIFIED AND OTHER, OR UN-IDENTIFIED SOURCES OF CONTAMINATION (COP-1 TO COP-4)
- ◆ FENCED PROHIBITION ZONE WITH HAZARDOUS WASTE (COP-5 TO COP-10)
- ◆ FENCED PROHIBITION ZONE WITH HAZARDOUS WASTE (COP-11 TO COP-15)
- CONTAMINATED FURNITURE IDENTIFIED AND (COP-1 TO COP-4)
- FENCED ZONE
- AREA OF ENVIRONMENTAL CONCERN

NOTES:

1. GENERAL SITE PLAN WAS BASED ON AND ADAPTED FROM DRAWINGS PROVIDED BY CONTAMINATION.



**L.E. CARPENTER AND CO.
WHARTON, NEW JERSEY**

AREAS OF ENVIRONMENTAL CONCERN (AEC)

DRAWING NO.
SAM 3-1

DATE
7/10/90

REVISION
1

FIGURE 3-1



Table 3-1

**Summary of Supplemental Sampling,
August 1990**

Sample Identifier	Media	Analytes
TP80A	Soil	PCB
TP80B	Soil	PCB
TP80C	Soil	PCB
TP81A	Soil	PCB
TP81B	Soil	PCB
TP81C	Soil	PCB
TP82A	Soil	PCB
TP82B	Soil	PCB
TP82C	Soil	PCB
TP83A	Soil	PCB, VOC +10, BN +10
TP83B	Soil	PCB, VOC +10, BN +10
TP84A	Soil	PCB, VOC +10, BN +10
TP84B	Soil	PCB, VOC +10, BN +10
TP84C	Soil	PCB, VOC +10, BN +10
TP85A	Soil	PCB, VOC +10, BN +10
TP85B	Soil	PCB, VOC +10, BN +10
TP85C	Soil	PCB, VOC +10, BN +10
TP86A	Soil	PCB, VOC +10, BN +10
TP86B	Soil	PCB, VOC +10, BN +10
TP86C	Soil	PCB, VOC +10, BN +10
TP87A	Soil	PCB, VOC +10, BN +10
TP87B	Soil	PCB, VOC +10, BN +10
TP88A	Soil	PCB, VOC +10, BN +10
TP88B	Soil	PCB, VOC +10, BN +10



Table 3-1
(continued)

Sample Identifier	Media	Analytes
TP89	Soil	PCB, VOC +10, BN +10
TP90	Soil	TAL metals, VO +10
TP91	Soil	TAL metals, VO +10
SS07	Sediment	VOC +10, BN +10, PCB
SW07	Water	VOC +10, BN +10, PCB
SS08	Sediment	VOC +10
SW08	Water	VOC +10
SS09	Sediment	VOC +10, BN +10, PCB
SW09	Water	VOC +10, BN +10, PCB
SS10	Sediment	VOC +10, TAL metals
SW10	Water	VOC +10, TAL metals

NOTE:

VOC - Volatile Organic Compounds
BN - Base Neutral Compounds
PCB - Polychlorinated Biphenyl
TAL - Target Analyte List



To characterize the lateral and vertical extent of PCB contamination, a total of 9 soil samples were collected for analysis. The samples were collected from test pits, TP-80, TP-81 and TP-82 at depths of 0-6 in. (A), 18 - 24 in. (B), and, 42 - 48 in. (C) below the surface.

Test pits TP-80, TP-81, and TP-82 are located within 20 feet of either test pit TP-50 or TP-51 where PCB was detected during the RI. These locations are shown on Plate 1. Fill consisting of silty sand with gravel and cobbles and broken concrete fragments, some with steel rebar, was encountered from 0 to 2 feet in test pits TP-80 and TP-81. The soil encountered below the fill in test pits TP-80 and TP-81 and in the test pit TP-82 consisted of silty sand, silty sand with gravel, and sandy silt and cobbles. Groundwater was encountered between 3.5 and 4 feet below ground surface in each of the three test pits. No odors were observed in the test pits. Appendix A includes test pit logs.

3.2.2 Results

The results of the PCB analysis for samples from the three test pits TP-80, TP-81 and TP-82 are shown in Plate 1 (shallow soil) and Plate 3 (deep soil) and listed in Table 3-2 along with the previous results from RI test pits TP-50, TP-51, and TP-76. As with the previous results from test pits TP-50 and TP-51, the PCB detected in samples from test pits TP-80, TP-81, and TP-82 was Arochlor-1254. These results indicate that the extent of PCB in excess of 1,000 $\mu\text{g}/\text{kg}$ in soil is from ground surface to a depth of between 2 and 3 feet within the area enclosed by test pits TP-51, TP-81, TP-80, and TP-82.

3.3 SLUDGE IMPOUNDMENT AREA (AEC-B)

3.3.1 Overview

Previous sampling of sludge, groundwater, soil and review of historical aerial photographs had indicated that PCB contamination is limited to soil outside the former sludge impoundment area and in the vicinity of the former utility poles along the abandoned sewer



Table 3-2

**Summary of PCB Analytical Testing
Supplemental Sampling, AEC-A, Test Pit Results**

Sample Location	Date Sampled	Sample Depth (feet)	Arochlor-1254 ($\mu\text{g/kg}$)
TP-50A	4/10/89	0-0.5	2,900
TP-50B	4/10/89	3-3.5	320
TP-51A	4/10/90	0-0.5	530 J
TP-51B	4/10/89	3.5-4	ND
TP-80A	8/28/90	0-0.5	600
TP-80B	8/28/90	1.5-2	680
TP-80C	8/28/90	3.5-4	44 J
TP-81A	8/28/90	0-0.5	550
TP-81B	8/28/90	1.5-2	680
TP-81C	8/28/90	3.0-3.5	27 J
TP-82A	8/28/90	0-0.5	1,500
TP-82B	8/28/90	1.5-2	1,000
TP-82C	8/28/90	3.5-4	110 J

ND - Not detected

J - Estimated value below detection limit



line. The area is called AEC-B and is shown in Figure 3-1. The former sludge impoundment area is shown in Plate 1 in the vicinity of monitoring well MW-4.

To characterize the lateral and vertical extent of PCB, BN, and VOC contamination in the vicinity of test pits TP-2 and TP-3 a total of 16 soil samples were collected for analysis. Plate 1 shows test pit sampling locations TP-83, TP-84, TP-85, TP-86, TP-87, and TP-88. The samples were collected from three test pits surrounding test pits TP-2 and TP-3 at depths, where possible, of 0 to 0.5 ft (A), 1.5 to 2 ft.(B), and 3.5 to 4 ft. (C), below the surface.

These test pits were located 20 feet from the original locations, test pits TP-2 and TP-3, of samples containing PCB in excess of 1,000 $\mu\text{g}/\text{kg}$. Samples were analyzed for VOC +10, BN +10, and PCBs as listed in Table 3-1.

The soil encountered in the test pits included silty sand, silt, clay, and clay with sand. Groundwater was encountered at depths ranging from a minimum of 1.25 feet at test pit TP-89 to a maximum of about 4 feet at test pit TP-84. A layer of boulders with sandy, silty, clay matrix was encountered in the test pits TP-84, TP-86, TP-87, and TP-88 at a depth of 1 to 4 feet below ground surface. An oil-like sheen was observed on the surface of groundwater which filled the bottom of test pits TP-83 and TP-84. In addition a brown liquid was observed draining into test pit TP-88 from a depth of approximately 3.5 feet. This liquid appeared to float atop the water and did not mix. A strong, petroleum hydrocarbon or solvent-like odor was observed in test pit TP-83, in test pit TP-84 at a depth of 3 to 3.5 feet, and in test pits TP-86 and TP-88. Appendix A includes test pit logs.

3.3.2 Results

The results of VOC analyses of soil samples from test pits within AEC-B indicate that VOCs are not present at concentrations above 1,000 $\mu\text{g}/\text{kg}$ in shallow soil from 0 to 0.5 feet below ground surface in the area enclosed by test pits TP-3, TP-83, TP-84, TP-85, TP-86, TP-87,



and TP-88. The sample TP-83B from test pit TP-83 was collected from a depth of 2 to 2.5 feet and contained 0.28 percent (2,800,000 $\mu\text{g/kg}$) of xylene and 400,000 $\mu\text{g/kg}$ of ethyl benzene. These were the primary VOCs detected at comparable depths in most of the test pits in AEC-B. These same test pits probably enclose an area where VOCs are present at concentrations above 1,000 mg/kg at a depth of 1.5 to 5 feet. VOC results from test pit TP-84 and test pits TP-87 and TP-89 indicate that the extent of VOCs in the soil in excess of 1,000 $\mu\text{g/kg}$ has been delineated to the east and southwest, respectively. VOCs in excess of 1,000 $\mu\text{g/kg}$ are present in soil samples from test pits TP-3, TP-83, TP-86, and TP-88 at depths ranging from 1.5 to 5 feet below ground surface. Furthermore the concentration of VOCs appears to increase with depth and in samples closer to the drainage ditch. This suggests that the sources of the VOCs in the soil are groundwater and the drainage ditch. VOCs in soil appear to extend north of test pits TP-83 and TP-88 towards the drainage ditch and south of test pit TP-86.

The VOC results for RI samples from test pits TP-2 and TP-3 are listed in Table 3-3. The VOC results for supplemental samples from test pits TP-83, TP-84, TP-85, TP-86, TP-87, and TP-88 are listed in Table 3-4. The locations of these test pits and a data summary are shown on Plates 1 (shallow soil quality data, 0-0.5 feet) and 2 (deep soil quality 0.5 to 5 feet).

With the exception of the soil sample from test pit TP-85, collected from a depth of 2 to 2.5 feet, all soil samples collected from test pits in AEC-B during the supplemental sampling had total targeted base neutral concentrations in excess of 10,000 $\mu\text{g/kg}$. The primary BN compound detected was bis(2-ethylhexyl) phthalate. As was the case with VOC compounds, the concentration of base neutrals tends to increase with depth closer to the water table and in samples closer to the drainage ditch, indicating potential sources. These samples and the samples collected from test pits TP-2 and TP-3 during the RI, were collected at depths ranging from 0 to 5 feet.



Table 3-3

Summary of Volatile Organics Analytical Testing
Remedial Investigation, AEC-B, Test Pit Results

Sample ID:	TP-2A	TP-2B	TP-3A	TP-3B e
Date Sampled:	3/23/89	3/23/89	3/22/89	3/22/89
Sample Depth (feet):	0 - 0.5	1.7	0 - 0.5	4.5 - 5
Parameter ($\mu\text{g}/\text{kg}$)				
Methylene Chloride	12 Jp	21 Jp	25 Jp	840 JB
1,1,1-Trichloromethane	ND	12	ND	ND
2-Chloroethyl vinyl ether	ND	12	ND	ND
Ethylbenzene	ND	ND	ND	14,000
Xylenes (Total)@	ND	ND	ND	31,000
Total Targeted VOCs ***	ND	12	ND	45,840 e
<p>Notes: J - Detected below reporting limit or is an estimated concentration. p - Compound also detected in laboratory method blank. B - Compound also detected in laboratory method blank. Sample concentration is over 5 times the concentration found in the method blank. e - NJDEP Tier I sample holding time was exceeded. @ - Xylenes, acetone, 2-butanone, carbon disulfide, vinyl acetate, 4-methyl-2-pentanone, 2-hexanone and styrene were not analyzed as targeted compounds for these samples during the original RI. Where detected (as non-targeted compounds), they are totaled here as targeted compounds. *** - Excludes p values; includes J and B values.</p>				

Table 3-4

**Summary of Volatile Organics Analytical Testing
Supplemental Sampling, AEC-B, Test Pit Results**

Sample ID:	TP-83A	TP-83B	TP-84A	TP-84B	TP-84C	TP-84C-1*	TP-85A	TP-85B	TP-85C
Date Sampled:	8/28/89	8/28/89	8/27/89	8/27/89	8/27/89	8/27/89	8/28/89	8/28/89	8/28/89
Sample Depth (feet):	0 - 0.5	2 - 2.5	0 - 0.5	2 - 2.5	3 - 3.5	3 - 3.5	0 - 0.5	2 - 2.5	2.5 - 3
Parameter ($\mu\text{g/kg}$)									
Methylene Chloride	25 JB*	150,000 JB	15 JB*	220 JB	59 JB	46 JB	73 JB	49 JB	80 JB
Acetone	ND**	65,000 JB	ND**	710 JB	110 JB	97 JB	ND**	ND	150 JB
2-Butanone	ND	ND	ND	ND	ND	ND	ND	1 J	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	2 J	ND	ND
Tetrachloroethane	ND	ND	ND	ND	2 J	ND	10	4 J	8
1,1,2,2-Tetrachloroethane	18	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	4 J	2 J	ND	ND	ND	ND
Ethylbenzene	13	400,000	ND	ND	ND	ND	1 J	290	67
Xylenes (total)	92	2,800,000	ND	41	5 J	ND	7	600	140



Table 3-4
(continued)

Sample ID:	TP-83A	TP-83B	TP-84A	TP-84B	TP-84C	TP-84C-1*	TP-85A	TP-85B	TP-85C
Date Sampled:	8/28/89	8/28/89	8/27/89	8/27/89	8/27/89	8/27/89	8/28/89	8/28/89	8/28/89
Sample Depth (feet):	0 - 0.5	2 - 2.5	0 - 0.5	2 - 2.5	3 - 3.5	3 - 3.5	0 - 0.5	2 - 2.5	2.5 - 3
Parameter ($\mu\text{g/kg}$)									
Total Targeted VOC ***	171	3,415,000	35	975	178	143	108	944	445
<p>Notes: J - Detected below reporting limit or is an estimated concentration.</p> <p>B - Compound also detected in laboratory method blank. Sample concentration is over 5 times the concentration found in the method blank.</p> <p>ND - Not detected.</p> <p>* - Duplicate Sample.</p> <p>** - Analyte reported in sample at a concentration less than 3 times the concentration reported in the method blank.</p> <p>*** - Includes J and B values.</p> <p>B* - The concentration of this compound in the method blank is between 3 and 5 times the CRDL. Based on NJDEP Tier I guidelines, this value is qualified because the presence of the analyte in the sample may be caused by laboratory contamination.</p>									



Table 3-4
(continued)

Sample ID:	TP-86A	TP-86B	TP-86C	TP-87A	TP-87B	TP-88A	TP-88B
Date Sampled:	8/28/89	8/28/89	8/28/89	8/28/89	8/27/89	8/28/89	8/28/89
Sample Depth (feet):	0 - 0.5	1.5 - 2	3.5 - 4	0 - 0.5	1.5 - 2	0 - 0.5	2.5 - 3
Parameter ($\mu\text{g/kg}$)							
Methylene Chloride	62 JB	6,800 JB	16,000 JB	34 JB*	35 JB*	36 JB	310 JB
Acetone	52 JB	ND	9,200 JB*	10 JB*	ND	92 JB	690 JB
2-Butanone	ND	ND	ND	ND	ND	ND	47 J
Trichloroethene	ND	ND	ND	ND	ND	2 J	ND
Tetrachloroethane	7	ND	ND	3 J	ND	15	7 J
Toluene	ND	330 J	550 J	ND	ND	ND	26 J
Ethylbenzene	ND	1,300	140,000	ND	6	ND	290,000
Xylenes (total)	ND	20,000	790,000	2 J	43	1 J	1,800,000
Total Targeted VOC ***	121	28,430	955,750	49	84	146	2,091,080
<p>Notes: J - Detected below reporting limit or is an estimated concentration. B - Compound also detected in laboratory method blank. Sample concentration is over 5 times the concentration found in the laboratory method blank. ND - Not detected. *** - Includes J and B values. B* - The concentration of this compound in the method blank is between 3 and 5 times the CRDL. Based on NJDEP Tier I guidelines, this value is qualified because the presence of the analyte in the sample may be caused by laboratory contamination.</p>							





The BN results for RI samples from test pits TP-2 and TP-3 are listed on Table 3-5. The BN results for supplemental samples from test pits TP-83, TP-84, TP-85, TP-86, TP-87, and TP-88 are listed on Table 3-6. The results for samples from test pit TP-89 are discussed in Subsection 3.6 and are listed on Tables 3-22, 3-23, and 3-24. The locations of these test pits and a data summary are shown on Plates 1 and 2.

The results for PCB analyses of soil samples from test pits within AEC-B, in contrast to those for VOCs and BNs, show PCB in excess of 1,000 $\mu\text{g}/\text{kg}$ most often in shallow (0-0.5 feet) soil samples. The only PCB detected was Arochlor 1254. While PCBs are not present above 1,000 $\mu\text{g}/\text{kg}$ in soil sample TP-83A, they are present in excess of 1,000 $\mu\text{g}/\text{kg}$ in all other shallow (0-0.5 feet) soil samples collected from test pits TP-3, TP-84, TP-85, TP-86, TP-87, and TP-88. In contrast, at depths ranging from 0.5 to 5 feet, PCBs are not present above 1,000 $\mu\text{g}/\text{kg}$ in samples from test pits TP-3, TP-83, TP-84, and TP-85 thereby defining the lateral and vertical extent of PCB contamination at depths from 0.5 to 5 feet along the western side of AEC-B. However, samples from test pits TP-88, TP-87, TP-89, and TP-86, along the northern, eastern and southern sides of AEC-B show PCB in excess of 1,000 $\mu\text{g}/\text{kg}$ but none exceed 5,000 $\mu\text{g}/\text{kg}$.

Listed on Table 3-7 are the PCB results for RI samples from test pits TP-2 and TP-3, and for supplemental samples from test pits TP-83, TP-84, TP-85, TP-86, TP-87, and TP-88. The PCB results for TP-89 are listed in Table 3-24 and discussed in Subsection 3.6.

3.4 AIR PRODUCTS DRAINAGE DITCH -- ROCKAWAY RIVER (AEC-C)

3.4.1 Overview

AEC-C is composed of the drainage ditch that follows the approximate property boundary between Air Products & Chemical, Inc. and the L.E. Carpenter site as shown in Figure 3-1. This ditch receives runoff from off-site, and sheet runoff from a limited area of the L.E. Carpenter site immediately adjacent to the ditch. In addition, drainage from several paved areas of the site discharge to a storm sewer that discharges to this drainage ditch. The



Table 3-5

**Summary of Base Neutral Analytical Testing
Remedial Investigation, AEC-B, Test Pit Results**

Sample ID:	TP-2A	TP-2B	TP-3A	TP-3B
Date Sampled:	3/23/89	3/23/89	3/22/89	3/22/89
Sample Depth (feet):	0 - 0.5	1.7	0 - 0.5	4.5 - 5
Parameter ($\mu\text{g/kg}$)				
Phenanthrene	560 J	ND	ND	ND
Di-n-butyl phthalate	ND	ND	3,000 JB	4,900 JB
Fluoranthene	1,200 J	ND	ND	ND
Pyrene	1,200 J	ND	ND	ND
bis(2-Ethylhexyl)phthalate	13,000	440,000	34,000	96,000
Chrysene	660 J	ND	ND	ND
Total Targeted Base Neutrals ***	16,620 e	440,000	37,000	100,900
<p>Notes: J - Detected below reporting limit or is an estimated concentration. B - Compound also detected in laboratory method blank and sample concentration is over 5 times the concentration found in the laboratory method blank. e - NJDEP Tier sample holding time was exceeded. ND - Not detected. *** - Includes J and B values.</p>				



Table 3-6

Summary of Base Neutral Analytical Testing,
Supplemental Sampling, AEC-B, Test Pit Results

Sample ID:	TP-83A	TP-83B	TP-84A	TP-84B	TP-84C	TP-84C-1*	TP-85A	TP-85B	TP-85C
Date Sampled:	8/28/89	8/28/89	8/27/89	8/27/89	8/27/89	8/27/89	8/28/89	8/28/89	8/28/89
Sample Depth (feet):	0 - 0.5	2 - 2.5	0 - 0.5	2 - 2.5	3 - 3.5	3 - 3.5	0 - 0.5	2 - 2.5	2.5 - 3
Parameter ($\mu\text{g/kg}$)									
Naphthalene	ND	110 J	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	59 J	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ND	84 J	ND	ND	ND	ND	230 J	ND	ND
Di-n-butyl phthalate	470 J	670	460 J	ND	ND	69 J	310 J	370 J	ND
Fluoranthene	ND	53 J	ND	ND	ND	ND	500 J	ND	ND
Pyrene	ND	120 J	ND	ND	ND	ND	570 J	ND	ND
Butyl benzyl phthalate	ND	ND	ND	ND	ND	51 J	ND	ND	2,000 J
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	390 J	ND	ND
bis(2-Ethylhexyl) phthalate	4,000,000 JB	2,400,000 JB	30,000 JB	16,000 JB	6,900 JB	510,000 JB	27,000 JB	1,500 JB	830,000 JB

Table 3-6
(continued)

Sample ID:	TP-83A	TP-83B	TP-84A	TP-84B	TP-84C	TP-84C-1*	TP-85A	TP-85B	TP-85C
Date Sampled:	8/28/89	8/28/89	8/27/89	8/27/89	8/27/89	8/27/89	8/28/89	8/28/89	8/28/89
Sample Depth (feet):	0 - 0.5	2 - 2.5	0 - 0.5	2 - 2.5	3 - 3.5	3 - 3.5	0 - 0.5	2 - 2.5	2.5 - 3
Parameter ($\mu\text{g/kg}$)									
Chrysene	ND	ND	ND	ND	ND	ND	380 J	ND	ND
Di-n-octyl phthalate	ND	ND	ND	ND	ND	ND	ND	ND	8,100
Benzo(b) fluoranthene	ND	ND	ND	ND	ND	ND	270 J	ND	ND
Benzo(k) fluoranthene	ND	ND	ND	ND	ND	ND	290 J	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	340 J	ND	ND
Indeno(1,2,3- c,d)pyrene	ND	ND	ND	ND	ND	ND	290 J	ND	ND



Table 3-6
(continued)

Sample ID:	TP-83A	TP-83B	TP-84A	TP-84B	TP-84C	TP-84C-1*	TP-85A	TP-85B	TP-85C
Date Sampled:	8/28/89	8/28/89	8/27/89	8/27/89	8/27/89	8/27/89	8/28/89	8/28/89	8/28/89
Sample Depth (feet):	0 - 0.5	2 - 2.5	0 - 0.5	2 - 2.5	3 - 3.5	3 - 3.5	0 - 0.5	2 - 2.5	2.5 - 3
Parameter ($\mu\text{g/kg}$)									
Benzo(g,h,i) perylene	ND	ND	ND	ND	ND	ND	410 J	ND	ND
Total Targeted Base Neutrals ***	4,000,000	2,401,096	30,460	16,000	6,900	510,120	30,980	1,870	840,100
Notes: J - Detected below reporting limit or is an estimated concentration. B - Compound also detected in laboratory method blank and sample concentration is over 5 times the concentration found in the laboratory method blank. ND - Not detected. * - Duplicate Sample. *** - Includes J and B values.									



Table 3-6
(continued)

Sample ID:	TP-86A	TP-86B	TP-86C	TP-87A	TP-87B	TP-88A	TP-88B
Date Sampled:	8/28/89	8/28/89	8/28/89	8/28/89	8/27/89	8/28/89	8/28/89
Sample Depth (feet):	0 - 0.5	1.5 - 2	3.5 - 4	0 - 0.5	1.5 - 2	0 - 0.5	2.5 - 3
Parameter ($\mu\text{g/kg}$)							
Naphthalene	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ND	ND	ND	ND	ND	ND	370 J
Fluoranthene	ND	ND	ND	ND	ND	ND	ND
Pyrene	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ND	ND	540 J	ND	ND	ND	710 J
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	42,000 JB	650,000 JB	140,000 JB	58,000 JB	3,100,000 JB	23,000 JB	3,500,000 JB
Chrysene	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ND	1,100 J	420 J	ND	ND	ND	ND
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND



Table 3-6
(continued)

Sample ID:	TP-86A	TP-86B	TP-86C	TP-87A	TP-87B	TP-88A	TP-88B
Date Sampled:	8/28/89	8/28/89	8/28/89	8/28/89	8/27/89	8/28/89	8/28/89
Sample Depth (feet):	0 - 0.5	1.5 - 2	3.5 - 4	0 - 0.5	1.5 - 2	0 - 0.5	2.5 - 3
Parameter ($\mu\text{g/kg}$)							
Indeno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	ND	ND	ND	ND	ND	ND	ND
Total Targeted Base Neutrals ***	42,000	651,100	140,960	58,000	3,100,000	23,000	3,501,080
Notes: J - Detected below reporting limit or is an estimated concentration. B - Compound also detected in laboratory method blank and sample concentration is over 5 times the concentration found in the laboratory method blank. ND - Not detected. * - Duplicate Sample. *** - Includes J and B values.							



Table 3-7

Summary of PCB Analytical Testing,
Supplemental Sampling, AEC-B, Test Pit Results

Sample I.D.	Date Sampled	Sample Depth (feet)	Arochlor-1254 ($\mu\text{g/kg}$)
TP-2A	3/23/89	0 - 0.5	7,500
TP-2B	3/23/89	1.7	12,000
TP-3A	3/22/89	0 - 0.5	14,000
TP-3B	3/22/89	4.5-5	ND
TP-83A	8/28/90	0 - 0.5	680
TP-83B	8/28/90	2-2.5	260 J
TP-84A	8/27/90	0 - 0.5	18,000 J
TP-84B	8/27/90	2-2.5	180 J
TP-84C	8/27/90	3-3.5	210 J
TP-85A	8/28/90	0 - 0.5	13,000
TP-85B	8/28/90	2-2.5	220
TP-85C	8/28/90	2.5-3	760
TP-86A	8/28/90	0 - 0.5	8,200 J
TP-86B	8/28/90	1.5-2	1,700
TP-86C*	8/28/90	3.5-4	100 J [59 J]
TP-87A	8/28/90	0 - 0.5	6,500 J



Table 3-7
(continued)

Sample I.D.	Date Sampled	Sample Depth (feet)	Arochlor-1254 ($\mu\text{g/kg}$)
TP-87B	8/28/90	1.5-2	3,500 J
TP-88A	8/28/90	0 - 0.5	45,000 J
TP-88B	8/28/90	2-2.5	2,200 J
<p>J - Estimated value below detection limit</p> <p>ND - Not detected</p> <p>* - Value for duplicate sample shown in brackets</p>			





drainage ditch is postulated to be, in part, recharged by groundwater that flows beneath the L.E. Carpenter site. Historically, non-contact cooling water was allowed to discharge to the drainage ditch. Samples of surface water and sediments from the ditch were obtained immediately downgradient of the former non-contact cooling water discharge point during the first round of sampling conducted under the RI.

Additional characterization of the stream water quality was needed to assess the potential impact of the drainage ditch water on the Rockaway River.

A total of three surface sediment samples, SS-07, SS-08 and SS-09 and three surface water samples, SW-07, SW-08, and SW-09, were collected at points along the drainage ditch at the locations shown in Plate 1. In addition, one sediment and surface water sample, SS-10 and SW-10, were collected from the Rockaway River directly south of monitoring well MW-04 to supplement the data previously collected from the river. The rational and analytical parameters for each sample are summarized in Table 3-8. The configuration of the ditch made it impossible to collect an upgradient sample. The ditch has its headwaters in the flow from a pipe which may discharge typical roadway contaminants to the site.

3.4.2 Results

3.4.2.1 Drainage Ditch Sediments

During the RI a sediment sample was collected from the drained ditch at location SS-5 as shown in Plate 1. The results for VOC analysis of sample SS-5, as well as the other sediment samples collected during the RI, are listed in Table 3-9. The VOC results for samples SS-7, SS-8, and SS-9 are listed in Table 3-10. The results for BN analyses of these samples are listed on Tables 3-11 and 3-12. Table 3-13 lists the results for PCB analysis of samples SS-7 and SS-9.

The VOC methylene chloride has been detected at similar concentrations at upstream location SS-7, mid-stream locations SS-5 and SS-8, and downstream location SS-9. Even



Table 3-8

**Rationale for Supplemental Surface Water
and Sediment Sampling - AEC-C**

Location	Sample	Rational	Analytical Parameters
Former outfall from starch beds to ditch	SS-07 SW-07	Assess migration of contaminants from starch bed operations and upgradient locations	VOC +10, BN +10, PCB
Bend in drainage ditch	SS-08 SW-08	Assess downgradient quality of ditch	VOC +10
Junction of ditch and rockaway river	SS-09 SW-09	Assess impact of ditch on river quality	VOC +10, BN +10, PCB
Rockaway River south of MW4	SS-10 SW-10	Assess impact of site contaminants on rockaway river	VOC +10, TAL Metals

Table 3-9

Summary of Volatile Organics Analytical Testing
Remedial Investigation, AEC-C
Sediment Results

SAMPLE ID: DATE SAMPLED:	SS-1 3/14/89	SS-2 3/14/89	SS-3 q 3/14/89	SS-4 3/14/89	SS-5 8/2/89	SS-6 3/14/89
PARAMETER ^a ($\mu\text{g/kg}$)						
Methylene Chloride	ND	59 J	39 JB	43 JB	29 J	24 JB
Toluene	3.3 J	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	25
Ethylbenzene	ND	ND	ND	ND	17	ND
Xylenes (total) ^a	ND	ND	ND	ND	220	ND
TOTAL TARGETED VOC ^{***}	3.3	59	39 q	43	266	49

- NOTES: J - Detected below reporting limit or is an estimated concentration.
 p - Compound also detected in laboratory method blank.
 B - Compound also detected in laboratory method blank. Sample concentration is over 5 times the concentration found in the method blank.
^a - Xylenes, acetone, 2-butanone, vinyl acetate, carbon disulfide, 4-methyl-2-pentanone, 2-hexanone, and styrene were not analyzed as targeted compounds for the sediment samples collected during the original RI. Where detected (as non-targeted compounds), they are totaled here as targeted compounds.
 q - These results are rejected as per NJDEP QAS pending receipt of the initial calibration summary.
 ND - Not detected.
^{***} - Excludes p values; includes J and B values.



Table 3-10
Summary of Volatile Organics Analytical Testing
Supplemental Sampling, AEC-C
Sediment Results

SAMPLE ID:	SS-7	SS-7-1*	SS-8	SS-9	SS-10
DATE SAMPLED:	8/27/90	8/27/90	8/27/90	8/28/90	8/28/90
PARAMETER ($\mu\text{g/kg}$)					
Methylene Chloride	49 JB	46 JB	25 JB*	66 JB	29 JB
Acetone	58 JB*	77 JB	58 JB	240 JB	47 JB*
2-Butanone	ND	ND	ND	53	ND
Tetrachloroethane	ND	ND	ND	5 J	ND
Toluene	ND	ND	ND	3 J	ND
Xylenes (total)	ND	ND	ND	3 J	ND
TOTAL TARGETED VOLATILE ORGANICS ***	107	123	83	304	76

- NOTES:
- J - Detected below reporting limit or is an estimated concentration.
 - B - Compound also detected in laboratory method blank. Sample concentration is more than 5 times the concentration found in the method blank.
 - B* - The concentration of this compound in the method blank is between 3 and 5 times the CRDL. Based on NJDEP Tier I guidelines, this value is qualified because the presence of the analyte may be due to laboratory contamination.
 - ND - Not detected.
 - * - Duplicate sample.
 - *** - Includes J and B values.





Table 3-11

**Summary of Base/Neutral Analytical Testing,
Remedial Investigation, (AEC-C) Sediment Results**

Sample ID: Date Sampled:	SS-1 3/14/89	SS-2 3/14/89	SS-3 q 3/14/89	SS-4 3/14/89	SS-5 8/2/89	SS-6 3/14/89
Parameter (µg/kg)						
Naphthalene	200 J	310 J	690 J	ND	ND	ND
Acenaphthylene	ND	490 J	ND	ND	ND	ND
Acenaphthene	ND	430 J	1,300 J	ND	ND	ND
Fluorene	ND	610 J	1,300 J	ND	ND	ND
Phenanthrene	600 J	4,900	10,000	ND	1,800 J	1,000 J
Anthracene	140 J	1,200 J	2,600 J	ND	490 J	ND
Di-n-butyl phthalate	680 J	ND	2,300 JB	380 JB	380 J	1,800 JB
Fluoranthene	800 J	5,200	14,000	ND	4,000	2,800 J
Pyrene	700 J	6,100	11,000	ND	3,500	2,800 J
Butyl benzyl phthalate	ND	920 J	ND	ND	ND	ND
Benzo(a)anthracene	380 J	3,100	6,400	ND	1,600 J	1,500 J
Bis(2-Ethylhexyl)phthalate	1,100 J	55,000	54,000	22,000	520,000 B*	74,000
Chrysene	560 J	4,300	6,500	ND	2,500 J	1,800 J
Benzo(b)fluoranthene	540 JL	6,400 L	8,200 L	ND	3,800 L	2,300 JL
Benzo(k)fluoranthene	540 JL	6,400 L	8,200 L	ND	3,800 L	2,300 JL
Benzo(a)pyrene	300 J	2,900 J	4,700	ND	1,500 J	1,200 J
Indeno(1,2,3-c,d)pyrene	ND	1,500 J	2,500 J	ND	550 J	950 J

- Note:
- J - Detected below reporting limit or is an estimated concentration.
 - L - The laboratory was unable to quantify these two compounds separately. The value reported is a combined value.
 - ND - Not detected.
 - B - Compound also detected in the laboratory method blank. Sample concentration is over 5 times the concentration found in method blank.
 - B* - The concentration of this compound in the method blank is between 3 and 5 times the CRDL. Based on NJDEP Tier I guidelines, this value is qualified because the presence of the analyte may be due to laboratory contamination.
 - q - These results are rejected as per NJDEP QAS because the internal standard areas of the method blank and a continuing calibration compound % deviation are outside method 8270 limits.
 - *** - Includes J and B values and one of two compounds quantified together (L values).



Table 3-11
(continued)

Sample ID:	SS-1	SS-2	SS-3 q	SS-4	SS-5	SS-6
Date Sampled:	3/14/89	3/14/89	3/14/89	3/14/89	8/2/89	3/14/89
Parameter (µg/kg)						
Dibenzo(a,h)anthracene	ND	430 J	1400 J	ND	ND	ND
Benzo(g,h,i)perylene	ND	1,700 J	3,300 J	ND	710 J	950 J
Total Targeted Base Neutrals***	6,000	95,490	130,190 q	22,380	540,830	91,100

- Note:
- J - Detected below reporting limit or is an estimated concentration.
 - L - The laboratory was unable to quantify these two compounds separately. The value reported is a combined value.
 - ND - Not detected.
 - B - Compound also detected in the laboratory method blank. Sample concentration is over 5 times the concentration found in method blank.
 - B* - The concentration of this compound in the method blank is between 3 and 5 times the CRDL. Based on NJDEP Tier I guidelines, this value is qualified because the presence of the analyte may be due to laboratory contamination.
 - q - These results are rejected as per NJDEP QAS because the internal standard areas of the method blank and a continuing calibration compound % deviation are outside method 8270 limits.
 - *** - Includes J and B values and one of two compounds quantified together (L values).



Table 3-12

**Summary of Base/Neutral Analytical Testing
Supplemental Sampling, AEC-C, Sediment Results**

Sample ID: Date Sampled:	SS-7 8/27/90	SS-7-1* 8/27/90	SS-9 8/27/90
Parameter ($\mu\text{g/kg}$)			
Naphthalene	74 J	650 J	ND
Acenaphthene	ND	260 J	ND
Fluorene	ND	280 J	ND
Phenanthrene	370 J	2,600	90 J
Anthracene	56 J	450 J	ND
Di-n-butyl phthalate	58 J	380 J	41 J
Fluoranthene	320 J	3,500	170 J
Pyrene	360 J	2,600	73 J
Benzo(a)anthracene	270 J	1,400 J	71 J
Bis(2-Ethylhexyl)phthalate	690 JB	2,300 JB	2,600 JB
Chrysene	94 J	2,000 J	94 J
Benzo(b)fluoranthene	200 J	1,100 J	53 J
Benzo(k)fluoranthene	210 J	1,400 J	71 J
Benzo(a)pyrene	210 J	1,100 J	58 J
Indeno(1,2,3-c,d)pyrene	190 J	1,900 J	48 J

- Note:
- J - Detected below reporting limit or is an estimated concentration.
 - ND - Not detected.
 - B - Compound also detected in the laboratory method blank. Sample concentration is more than 5 times the concentration found in method blank.
 - B* - The concentration of this compound in the method blank is between 3 and 5 times the CRDL. Based on NJDEP Tier I guidelines, this value is qualified because the presence of the analyte may be due to laboratory contamination.
 - *** - Includes J and B values and one of two compounds quantified together (L values).
 - * - Duplicate Sample.



Table 3-12
(continued)

Sample ID:	SS-7	SS-7-1*	SS-9
Date Sampled:	8/27/90	8/27/90	8/27/90
Parameter (µg/kg)			
Dibenzo(a,h)anthracene	64 J	780 J	ND
Benzo(g,h,i)perylene	260 J	2,300	55 J
Total Targeted Base Neutrals***	3,426	250,000	3424

- Note:
- J - Detected below reporting limit or is an estimated concentration.
 - ND - Not detected.
 - B - Compound also detected in the laboratory method blank. Sample concentration is more than 5 times the concentration found in method blank.
 - B* - The concentration of this compound in the method blank is between 3 and 5 times the CRDL. Based on NJDEP Tier I guidelines, this value is qualified because the presence of the analyte may be due to laboratory contamination.
 - *** - Includes J and B values and one of two compounds quantified together (L values).
 - * - Duplicate Sample.



Table 3-13

**Summary of PCB Analytical Testing
Supplemental Sampling, AEC-C, Sediment Results**

Sample ID	Date Sampled	Sample Depth (feet)	Arochlor-1254 ($\mu\text{g}/\text{kg}$)
SS-7	8/27/90	0-0.5	36 J [ND]
SS-9	8/28/90	0-0.5	ND

ND - Not detected.

[] - Value for duplicate sample shown in brackets.

J - Detected below reporting limit or is an estimated concentration.



though methylene chloride was also detected in the method blank for samples SS-7 and SS-9, the concentration of the compound in the samples is high enough to be considered real. However, the presence of methylene chloride in Sample SS-8 is suspected to be due to laboratory contamination. The concentrations of methylene chloride observed in samples SS-7, SS-5, SS-8, and SS-9 are consistent with the concentration of 24 $\mu\text{g}/\text{kg}$ observed in sample SS-6. Sample SS-6 was collected during the RI from a surface depression in the northwest corner of the site, see Plate 1, which currently receives stormwater discharge from offsite and had received discharge from Buildings 8 and 9. This area may serve as a source of methylene chloride to the drainage ditch. Other possible sources include, but are not limited to, erosion and runoff from the L.E. Carpenter or Air Products facilities, and groundwater discharge.

Similarly, the VOC acetone has been detected at locations SS-7, SS-8, and SS-9. It was not detected at SS-5. Like methylene chloride, acetone is a common laboratory contaminant and was detected in the method blank for samples SS-7, SS-8, and SS-9. However, the concentration is high enough in these samples to be considered real. Unlike methylene chloride, acetone was not detected in sample SS-6. This suggests that the source for acetone may be discharges from off-site sources. Other possible sources include, but are not limited to, erosion and runoff from the L.E. Carpenter or Air Products facilities, and groundwater discharge.

Additional VOC compounds were detected only at locations SS-5 and SS-9. In sample SS-5, ethylbenzene and xylenes were detected. In sample SS-9, 2-butanone and trace levels of tetrachloroethene, toluene, and xylenes were detected. These data suggest that VOCs, particularly xylenes, are entering the ditch in the vicinity of location SS-5. The absence of xylenes in sample SS-8 and their trace level concentration in sample SS-9 indicate that xylenes are probably not migrating downstream. In addition, it is therefore possible that the other VOCs in sample SS-9 are not from the drainage ditch.



The results of the BN analyses of samples SS-7, SS-9, and previously collected samples SS-5 and SS-6 show the highest concentrations in the vicinity of sampling location SS-5. However, the results from sample SS-7, while lower than those of sample SS-5, suggest that the drainage ditch is receiving base-neutral compounds in the vicinity of both sampling locations, possibly from previous discharges to the starch drying beds, and erosion and runoff from the L.E. Carpenter or Air Products facilities. Shallow soil sample results from sediment sampling location SS-6 and test pits TP-4, TP-83, and TP-88 indicate that soils containing significant levels of BN compounds are close to the drainage ditch.

The BN results from sample SS-9 show a relatively low total concentration of 3,424 $\mu\text{g}/\text{kg}$. However, the bulk of this value consists of bis(2-ethylhexylphthalate) at 2,600 $\mu\text{g}/\text{kg}$. This concentration is similar to those detected in samples SS-7 and SS-7-1, at the head of the drainage ditch, but much lower than the value detected at SS-5 of 520,000 $\mu\text{g}/\text{kg}$. These results suggest that the river could be receiving BNs and, in particular, bis(2-ethylhexylphthalate) from the drainage ditch. However, given that BNs have been detected at sampling location SS-2, the source of BNs at location SS-9 may be upstream sediments.

The results for PCB analyses show that Arochlor-1254 was detected at a very low concentration estimated at 36 $\mu\text{g}/\text{kg}$ in sample SS-7. However, PCBs were not detected in the duplicate sample SS-7-1. PCBs were not detected in sample SS-9. These results indicate that while PCBs may be entering the drainage ditch at very low concentrations in the vicinity of sampling location SS-7 they are not migrating downstream towards the river. PCBs have been detected in soil from test pits in the former starch drying beds.

3.4.2.2 Drainage Ditch Surface Water

VOC compounds were not detected in surface water samples SW-7, SW-7-1 (duplicate), SW-8, and SW-9. However, in sample SW-5, collected during the RI, a total of 51.2 $\mu\text{g}/\text{L}$ of VOCs were detected including 44 $\mu\text{g}/\text{L}$ of total xylenes. The results for samples SW-5 are in Table 3-14 and those for samples SW-7 through SW-9 are listed in Table 3-15. These



Table 3-14

Summary of Volatile Organics Analytical Testing,
Remedial Investigation, AEC,C, Surface Water Results

Sample ID: Date Sampled:	SW-1 e 3/14/89	SW-2 e 3/14/89	SW-3 e 3/14/89	SW-4 e 3/14/89	SW-5 e 8/2/89	SW-6 e 3/14/89
Parameter @ ($\mu\text{g/l}$)						
Methylene Chloride	1.0 J	ND	ND	ND	3.8 Jp	3.8 J
1,1,1-Trichloromethane	ND	ND	ND	ND	3.7 J	ND
Chlorobenzene	ND	ND	ND	ND	ND	1.2 J
Ethylbenzene	ND	ND	ND	ND	3.5 J	ND
Xylenes (total) @	ND	ND	ND	ND	44	ND
Total Targeted VOC***	1.0 e	ND e	ND e	ND e	51.2 e	5.0 e

Note: J - Detected below reporting limit or is an estimated concentration.
p - Compound also detected in laboratory method blank.
e - NJDEP Tier I sample holding times was exceeded.
@ - Xylenes, acetone, 2-butanone, vinyl acetate, carbon disulfide, 4-methyl-2-pentanone, 2-hexanone and styrene were not analyzed as targeted compounds for these samples collected during the original RI. Where detected (as non-targeted compounds) they are totaled here as targeted compounds.
ND - Not detected.
*** - Excludes p values; includes J values.



Table 3-15

**Summary of Volatile Organics Analytical Testing
Supplemental Sampling AEC,C, Surface Water Results**

Sample ID:	SW-7	SW-7-1*	SW-8	SW-9	SW-10
Date Sampled:	8/27/90	8/27/90	8/27/90	8/28/90	8/28/90
Parameter ($\mu\text{g/l}$)					
Methylene Chloride	ND**	ND**	ND**	ND**	ND**
Total Targeted Volatile Organics	ND	ND	ND	ND	ND

Note: ND - Not detected.
* - Duplicate sample.
** - Compound detected in method blank. Sample concentration is less than 3 times the concentration reported in the method blank. Per NJDEP Tier I guidelines the result is negated.



results indicate that if VOCs are entering the drainage ditch they are doing so in the vicinity of sampling location SW-5 and they are not migrating downstream to the Rockaway River.

Tables 3-16 and 3-17 list the results of BN analyses of surface water samples collected during the RI and supplemental sampling, respectively. A very low level of bis(2-ethylhexyl)phthalate, probably caused by laboratory contamination, was detected in surface water samples SS-7 and SS-9. However, bis-(2 ethylhexyl)phthalate was not detected in duplicate sample SS-7-1 collected at location SS-7-1. These results indicate that BNs are not present in the surface water in the drainage ditch.

3.4.2.3 Rockaway River Sampling

In addition to samples SS-9 and SW-9, which were discussed above, sediment sample SS-10 and surface water samples SS-10 were collected from the Rockaway River adjacent to monitoring well MW-04 at the location shown on Plate 1. This sample was analyzed for VOCs and TAL metals. The VOC results for SS-10 and SW-10 are listed in Tables 3-10 and 3-15, respectively. The VOCs methylene chloride and acetone were detected in sample SS-10 at similar concentrations to those detected in samples SS-7, SS-7-1 and SS-8. While the acetone concentration may be due to laboratory contamination, the methylene chloride concentration is high enough, compared to the method blank concentration, to be considered real. In contrast, methylene chloride, as well as all other VOCs, were not detected in surface water sample SW-10. These results indicate that while river sediment in the vicinity of location SS-10 may be receiving methylene chloride, possibly from erosion and runoff from the L.E. Carpenter facility or from upstream sources, VOCs are not present in surface water at location SW-10. These results indicate that VOCs are probably not migrating into the river from the L.E. Carpenter site in the vicinity of location SS-10/SW-10. Tables 3-18 and 3-19 show the results for metals analysis of samples SS-10 and SW-10. Also listed are metals values for sediment and surface water samples collected during the RI. Surface water and sediment samples that had been scheduled for analysis of BNs were not collected at location SW-10, because of an oversight during sample collection.



Table 3-16

**Summary of Base/Neutral Analytical Testing,
Remedial Investigation, AEC-C Surface Water Results**

Sample ID:	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6
Date Sampled:	3/14/89	3/14/89	3/14/89	3/14/89	8/2/89	3/14/89
Parameter ($\mu\text{g/l}$)						
Di-n-butyl phthalate	ND**	ND**	ND**	ND**	ND	ND**
bis(2-Ethylhexyl)phthalate	ND	ND	ND	7.2 J	ND	ND
Total Targeted Base Neutrals***	ND	ND	ND	7.2	ND	ND

Note: J - Detected below reporting limit or is an estimated concentration.
ND - Not detected.
ND** - Originally reported value negated by NJDEP.
*** - Excludes p values; includes J values.



Table 3-17

**Summary of Volatile Organics Analytical Testing,
Supplemental Sampling, AEC-C, Surface Water Results**

Sample ID: Date Sampled:	SW-7 08/27/90	SW-7-1 08/27/90	SW-9 08/28/90
Parameter ($\mu\text{g/l}$)			
bis(2-Ethylhexyl)phthalate	7 JB*	ND**	6 JB*
Total Targeted Base Neutrals ***	ND	ND	ND

- Note:
- J - Detected below reporting limit or is an estimated concentration.
 - ND - Not detected.
 - B* - The concentration of this compound in the method blank is between 3 and 5 times the CRDL. Based on NJDEP Tier I guidelines, this value is qualified because the presence of the analyte may be due to laboratory contamination.
 - ** - Compound detected in method blank. Sample concentration is less than 3 times the concentration reported in the method blank. Per NJDEP Tier I guidelines the result is negated.
 - *** - Includes J and B values.



Table 3-18

**Summary of Metals Analytical Testing
Remedial and Supplemental Sampling, Sediment Results**

Sample ID:	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-10
Date Sampled:	3/14/89	3/14/89	3/14/89	3/14/89	8/2/89	3/14/89	8/28/89
Sample Depth (feet)	5 - 1.0	5 - 1.0	5 - 1.0	5 - 1.0	0 - 1.0	5 - 1.0	0 - 0.5
Parameter (mg/kg)							
Antimony	ND	ND	64.3	9.5 J	ND	ND	718
Arsenic	4.9	8.0	5.2	5.6	14	25.7	6.4 J
Beryllium	0.39 J	ND	0.35 J	0.65 J	0.8	0.39 J	1.5 J
Cadmium	ND	5.0	ND	1.5	2.1	3.0	2.5 J
Chromium	9.9	33.7	24.7	25.1	27	34.7	61.0
Copper	30.4	87.5	36.3	27.6	56	69.0	711
Lead	65.4	655	199	67.6	156	503	339
Mercury	ND	2.5	0.5	0.3	11	21	0.09 J
Nickel	6.5 J	18.9 J	17.1 J	15.2 J	19 J	18.3 J	29.0 J
Selenium	.70 J	0.93 J	0.39 J	ND	ND	0.35 J	0.57 J
Silver	ND	ND	ND	ND	ND	ND	ND
Thallium	ND	ND	ND	ND	ND	ND	ND
Zinc	46.3	547	228	74.2	282	336	250

Notes: J - Detected below contract required detection limit (CRDL).
 NA - Not analyzed.
 ND - Not detected.



Table 3-19

**Summary of TAL Metals Analytical Testing
Remedial and Supplemental Sampling, Surface Water Results**

Sample ID: Date Sampled:	SW-1 3/14/89	SW-2 3/14/89	SW-3 3/14/89	SW-4 3/14/89	SW-5 8/2/89	SW-6 3/14/89	SW-10 8/28/89
Parameter (mg/kg)							
Antimony	ND	ND	ND	22.8 J	ND	ND	ND
Arsenic	ND	ND	2.4 J	ND	10	15.9	3.9 J
Beryllium	ND	ND	ND	ND	ND	ND	ND
Cadmium	ND	ND	ND	ND	ND	22.2 J	ND
Chromium	ND	ND	8.0 J	ND	ND	231	ND
Copper	16.7 J	5.3 J	22.1 J	6.7 J	ND	405	ND
Lead	20.7	ND	87.2	2.7 J	6.0	1,340	4.6 J
Mercury	ND	ND	ND	ND	ND	2.8	ND
Nickel	ND	ND	ND	ND	ND	60.8 J	ND
Selenium	ND	ND	ND	ND	ND	7.1	ND
Silver	ND	ND	ND	ND	ND	ND	ND
Thallium	ND	ND	ND	ND	ND	ND	ND
Zinc	96.4	4.2 J	152	23.0	60	2,370	5.4 J
Notes: J - Detected below contract required detection limit (CRDL). ND - Not detected.							



3.5 BACKGROUND SOIL SAMPLING (AEC-D)

3.5.1 Overview

The L.E. Carpenter site appears to be constructed on fill materials. To assess background soil quality in areas of the site removed from former production areas, three soil samples (HA-26, HA-27 and HA-28) were collected from the area along Washington Pond. This area was designated as AEC-D in the Supplemental Sampling Plan (Weston Services, Inc., July 1990) and is shown in Figure 3-1. The samples were collected from the surface to 1 foot below grade using a hand auger and were analyzed for PP metals and VOC+10.

3.5.2 Results

The results for VOC analysis of background samples HA-26, HA-27, and HA-28 are shown in Table 3-20. These values represent VOC concentration in soils outside of known areas of past process or disposal activities at the L.E. Carpenter facility. VOCs were not detected at a concentration above 1,000 $\mu\text{g}/\text{kg}$ in the background soil samples. Only two compounds, methylene chloride and acetone, were detected. These compounds were also detected in the method blank and may, therefore, be caused by laboratory contamination. These results indicate that these samples are from an area of the site that has not been adversely affected by past site operations.

The results of the metals analysis of samples HA-26, HA-27, and HA-28 are listed in Table 3-21. These sampling locations and a results summary are shown in Plate 1 (lower left corner). These values represent metals concentrations in soils outside of known areas of past processes or disposal activities at the L.E. Carpenter facility. These values may be used during the feasibility study as a reference for existing site background levels. In Table 3-19 they are compared for reference only with applicable ECRA guidelines. Background concentrations of arsenic and lead appear to exceed the ECRA Guidelines. The upper 95 percent tolerance interval for these metals in the background samples is 148 mg/kg for arsenic and 986 mg/kg for lead.



Table 3-20

**Summary of Volatile Organics Testing,
Supplemental Sampling, AEC-D, Background Sediment Results**

Sample ID	HA-26	HA-27	HA-28
Date Sampled	8/27/90	8/27/90	8/27/90
Sample Depth	0 - 1	0 - 1	0 - 1
Parameter ($\mu\text{g/kg}$)			
Methylene Chloride	23 JB*	33 JB	34 JB
Acetone	ND**	ND**	73 JB
Total Targeted VOC ***	23	33	107

- Notes: J - Detected below reporting limit or is an estimated concentration.
B - Compound also detected in laboratory method blank. Sample concentration is over 5 times the concentration found in the laboratory blank.
ND - Not detected.
B* - The concentration of this compound in the method blank is between 3 and 5 times the CRDL. Based on NJDEP Tier I guidelines, this value is qualified because the presence of the analyte in the sample may be due to laboratory contamination.
** - Analyte was detected in the sample at a concentration less than 3 times the concentration detected in the laboratory method blank. Per NJDEP Tier I guidelines, the result is negated.
*** - Includes J and B values.



Table 3-21

**Summary of Metals Analytical Testing
Supplemental Sampling, AEC-D, Background Sample Results**

Sample ID Date Sampled Sample Depth (feet)	HA-26 8/27/90 0 - 1	HA-27 8/27/90 0 - 1	HA-28 8/27/90 0 - 1	ECRA Guidelines (mg/kg)
PARAMETER (mg/kg)				
Antimony	ND	ND	ND	NA
Arsenic	10.1	7.5 J	38.1	20
Beryllium	0.75 J	0.86 J	0.78 J	NA
Cadmium	0.8 J	ND	ND	3
Chromium	6.5 J	7.5 J	8.7 J	100
Copper	22.3 J	22.0 J	29.4	170
Lead	94.8	44.7	258	100
Mercury	0.06 J	0.12 J	0.15 J	1
Nickel	10.6 J	11.0 J	9.6 J	100
Selenium	ND	ND	3.2 J	4
Silver	ND	ND	ND	5
Thallium	ND	ND	ND	NA
Zinc	115	125	150	350

Notes: J - Detected below contract required detection limit (CRDL).
ND - Not Detected
NA - Not Applicable



3.6 ABANDONED SEWER LINE -- AEC-E

3.6.1 Overview

At the request of NJDEP, a soil sample was taken from test pit TP-89 from a depth of 0.7 to 1.2 feet which was immediately above groundwater. This test pit is located at the end of an abandoned sewer line. This area was designated AEC-E in the Supplemental Sampling Plan (WESTON Services, July 1990). This sample was analyzed for PCBs, VOC + 10, and BN + 10. The sample location is shown on Plate 2 in the upper right corner. Appendix A includes the log for test pit TP-89.

3.6.2 Results

The results for VOC + 10, BN + 10 and PCB analysis of the sample from test pit TP-89 are listed in Tables 3-22, 3-23, and 3-24, respectively. These results are shown in Plate 2 (back pocket) along with the results for the deep (0.5 to 4 feet) soil samples collected from AEC-B which is adjacent to AEC-E. The results show that total VOCs in the sample from TP-89 are less than 1,000 $\mu\text{g}/\text{kg}$. This result is consistent with VOC concentrations observed in adjacent test pit TP-87 and indicate that VOCs do not appear to be present in soils in the vicinity of the end of the abandoned sewer line.

In contrast, bis(2-ethylhexyl) phthalate was detected in the sample collected from test pit TP-89 at an estimated concentration of 80,000 $\mu\text{g}/\text{kg}$. This value is significantly lower than the concentration of base-neutral compounds detected in the test pits in AEC-B. The concentration of base-neutral compounds detected in the sample from test pit TP-89 is the lowest concentration detected immediately above the water table of any samples in adjacent AEC-B. This suggests that test pit TP-89 is located near the edge of the base-neutral soil contamination.



Table 3-22

**Summary of Volatile Organics Analytical Testing
Supplemental Sampling, AEC-E, Test Pit Results**

Sample ID: TP-89	
Date Sampled: 8/28/89	
Sample Depth (feet): 0.7-1.2	
Parameter ($\mu\text{g/kg}$)	
Methylene Chloride	72 JB
Acetone	310 JB
2-Butanone	17 J
Toluene	4 J
Ethylbenzene	26
Xylenes (total)	130
TOTAL TARGETED VOC ***	559

NOTES: J - Detected below reporting limit or is an estimated concentration.
B - Compound also detected in laboratory method blank. Sample concentration is more than 5 times the concentration found in the laboratory method blank.
*** - Includes J and B values.



Table 3-23

**Summary of Base Neutral Analytical Testing,
Supplemental Sampling, AEC-E, Test Pit Results**

Sample ID: TP-89	
Date Sampled: 8/28/89	
Sample Depth (feet): 0.7-1.2	
Parameter ($\mu\text{g/kg}$)	
bis(2-Ethylhexyl)phthalate	8,000 JB
TOTAL TARGETED BASE NEUTRALS ***	8,000

NOTES: J - Estimated concentration.

B - Compound also detected in laboratory method blank. Sample concentration is more than 10 times the concentration found in the laboratory method blank.

*** - Includes J and B values.



Table 3-24

**Summary of PCB Analytical Testing
Supplemental Sampling, AEC-E, Test Pit Results**

Sample I.D.	Date Sampled	Sample Depth (feet)	Arochlor-1254 (μg/kg)
TP-89	8/29/90	0.7-1.2	2,200 J

J - Estimated concentration.



The PCB Arochlor-1254 was detected at an estimated concentration of 2,200 $\mu\text{g}/\text{kg}$ in the sample from test pit TP-89. This value is similar to the concentrations detected in samples collected immediately above the water table from test pits TP-86, TP-87 and TP-88. These results indicate that PCBs are generally concentrated in the shallow soil (0.0 feet to 0.5 feet, Plate 1) in the vicinity of test pit TP-2. In addition, these results indicate that the area defined by test pits TP-83, TP-84, TP-85, TP-86, TP-88, and TP-89 may contain soil with PCB concentrations greater than 1,000 $\mu\text{g}/\text{kg}$ down to a depth of 3 to 4 feet.

3.7 GROUNDWATER FLOW AND THE WASHINGTON FORGE POND DAM

In their letter of 26 July 1990 regarding the Revised Report of Remedial Investigation Findings (GeoEngineering and WESTON, June 1990), the NJDEP requested that L.E. Carpenter evaluate the potential for groundwater flow toward the Rockaway River to contribute to base-neutral (BN) contamination found in river sediments. Specifically, the NJDEP suggested evaluating historical pond and stream level data, water level data from the L.E. Carpenter production well and the historic elevation of the Washington Forge Pond Dam.

To date, WESTON has been unable to find any records of pond, stream, or production well water level data. However, according to a former employee of Day International, Inc., the parent company of L. E. Carpenter, the pond has not been drained and has only been lowered once since at least 1944 when Mr. William Jordan began working at the facility (Redcliff, personal comm. 11/2/90). Another employee confirms that the pond has not been drained since 1967 when he started working at the site (Redcliff, personal comm. 11/2/90). L.E. Carpenter assumed ownership of the site in 1943 and disposed of waste in an on-site impoundment from approximately 1963 to 1970. Based on this information, it is reasonable to assume that the dam and the pond were in existence during the time when L.E. Carpenter operated the site as a production facility.



WESTON agrees that, in the absence of the dam and the pond behind it, groundwater flow in the shallow zone would probably be toward the Rockaway River. However, given that the dam and pond have been in place since at least 1944, it is reasonable to assume that underflow beneath the dam has existed since that time, as it does now, such that groundwater flow in the shallow and intermediate zones is and has been to the north-east and east. While lowering the pond level sufficiently might permit flow towards the river and thereby allow migration of BNs in that direction, this is a matter of speculation without sufficient data, at the present time, to evaluate either the plausibility or duration of such an event. Given the information available, possible sources of the BNs in the river sediments include erosion and transport of contaminated sediment from the site, and discharges to the river from upstream sources.



SECTION 4

CONCLUSIONS

4.1 STARCH DRYING BEDS, AEC-A

Samples from the three test pits sampled in AEC-A for PCBs contained low levels of the PCB Arochlor-1254. The concentrations in test pits TP-80 and TP-81 were less than 1,000 $\mu\text{g}/\text{kg}$. Samples from test pit TP-82 contained Arochlor-1254 at 1,500 $\mu\text{g}/\text{kg}$ (0 to 0.5 foot depth) and 1,000 $\mu\text{g}/\text{kg}$ (1.5 to 2 foot depth). All PCB concentrations in this area from both the RI and Supplemental Sampling were less than 5,000 $\mu\text{g}/\text{kg}$. The results indicate that PCB in excess of 1,000 $\mu\text{g}/\text{kg}$ appears to be confined to those soils from ground surface to a depth of between 2 and 3 feet within the area enclosed by test pits TP-51, TP-80, TP-81, and TP-82.

4.2 SLUDGE IMPOUNDMENT AREA (AEC-B)

The results of RI and Supplemental Soil Sampling indicate that VOCs are present in excess of 1,000 $\mu\text{g}/\text{kg}$ at a depth of 1.5 to 5 feet within the area enclosed by test pits TP-3, TP-83, TP-84, TP-85, TP-86, TP-87 and TP-88. The primary VOCs detected were xylene and ethylbenzene. Results of analyses of soil samples indicate that BN compounds are present in excess of 10,000 $\mu\text{g}/\text{kg}$ in soil from ground surface to the top of the water table (generally 5 feet or less) within AEC-B. The primary BN compound detected was bis(2-ethylhexyl)phthalate and several PAHs. Soil sample results indicate that PCB in excess of 1,000 $\mu\text{g}/\text{kg}$ is limited to the shallow soil, 0 to 0.5 feet, within AEC-B, and that PCB concentrations do not exceed 5,000 $\mu\text{g}/\text{kg}$.



4.3 DRAINAGE DITCH AND ROCKAWAY RIVER, AEC-C

None of the recent surface water samples from either the drainage ditch or the Rockaway River contained VOC or BN compounds. In the drainage ditch, total BN concentrations are moderate in the upgradient portion of the ditch, higher in the central portion at sampling location SS-05, and low (less than 10,000 $\mu\text{g}/\text{kg}$) downgradient at the confluence of the ditch and the Rockaway River. The source of BNs in the upgradient portion of the ditch may be stormwater runoff from off-site which enters the Carpenter property in the vicinity of sampling location SS-6. The primary BN compounds detected in the sediment samples from the ditch were bis(2-ethylhexyl)phthalate and several PAHs. The results indicate that the river may be receiving BN compounds from the drainage ditch or an upstream source. Total VOCs were not detected at concentrations above 1,000 $\mu\text{g}/\text{kg}$ in any of the RI or supplemental sediment samples. The sample results indicate that VOCs such as xylene are not migrating down the drainage ditch to the river. PCBs were not detected at concentrations exceeding detection limits in the RI or supplemental sediment samples.

4.4 BACKGROUND SOIL SAMPLING, AEC-D

VOC compounds were not detected in excess of 1,000 $\mu\text{g}/\text{kg}$ in the background soil samples, HA-26, HA-27 and HA-28, collected in AEC-D. Two metals compounds, arsenic and lead, were detected above ECRA guidelines in sample HA-28. These results were intended for characterization of soil conditions in areas removed from historical production and waste disposal operations. Two data will be used in the Risk Assessment process to evaluate metal concentrations in soil relative to background levels and areas of historical site operations and waste disposal.



4.5 ABANDONED SEWER LINE, AEC-E

The soil sample collected adjacent to the abandoned sewer line contained a concentration of total VOCs of less than 1,000 $\mu\text{g/kg}$. Bis(2-ethylhexyl)phthalate, at a concentration of 80,000 $\mu\text{g/kg}$, was the only BN detected. The PCB Arochlor-1254 was below the quantification limit at an estimated concentration of 2,200 $\mu\text{g/kg}$.

4.6 GROUNDWATER FLOW AND THE WASHINGTON FORGE POND

WESTON has not been able to locate sufficient data on the historical changes in the water level of Washington Forge Pond to estimate that lowering the pond level might change the groundwater flow direction such that base neutral compounds could move towards the Rockaway River. Personal communication with long-time site personnel indicates that the pond has not been drained since at least 1967. Reversal of groundwater flow direction caused by a lowering of the pond is unlikely. Given available information, possible sources of the BNs in the river sediments include erosion and transport of sediment from the site, adjacent properties and discharges to the river from upstream sources.



SECTION 5

REFERENCES

Geoengineering, Inc. and Roy F. Weston, Inc., June 1990. "Revised Report of Remedial Investigation Findings", Volumes I, II, and III.

Weston Services, Inc., July 1990. "Supplemental Sampling Plan, L.E. Carpenter Facility, Wharton, Morris County, New Jersey."

Redcliff, Ken, 2 November 1990. Personal Communication.



APPENDIX A
TEST PIT LOGS

TEST PIT LOG

TEST PIT ID: TP-80 CLIENT: L.E. Carpenter and Company
 SITE: Wharton Facility LOCATION: Wharton, New Jersey
 LOGGED BY: ROY F. WESTON, INC. SAMPLE METHOD: Grab
 DATE LOGGED: 28 August 1990 DEPTH TO WATER: 4.08 Feet
 GEOLOGIST: John N. Dougherty TOTAL DEPTH: 4 Feet

COMMENTS: Former starch drying bed area, AEC=A

DEPTH INTERVAL (FEET)	SAMPLE TYPE	LITHOLOGY DESCRIPTION	ANALYTICAL SAMPLE ID AND INTERVAL
0.0 - 0.5	FILL	FILL: Fabric, broken concrete with rebar; SOIL: Silty sand, SM COLOR: Very Dark Grayish Brown (10YR3/2)	TP-80-A, 0.0 - 0.5 Ft
0.5 - 2.0	FILL	FILL: Fabric, broken concrete with rebar; SOIL: Silty sand with gravel and boulders, SM COLOR: Very Dark Grayish Brown (10YR3/2)	TP-80-B, 1.5 - 2.0 Ft
2.0 - 4.0	NATURAL	SOIL: Silty sand with gravel and boulders, SM COLOR: Very Dark Grayish Brown (10YR3/2)	TP-80-C, 3.5 - 4.0 Ft

TEST PIT LOG

TEST PIT ID: TP-81 CLIENT: L.E. Carpenter and Company
 SITE: Wharton Facility LOCATION: Wharton, New Jersey
 LOGGED BY: ROY F. WESTON, INC. SAMPLE METHOD: Grab
 DATE LOGGED: 28 August 1990 DEPTH TO WATER: 3.5 Feet
 GEOLOGIST: John N. Dougherty TOTAL DEPTH: 4 Feet

COMMENTS: Former starch drying bed area, AEC-A

DEPTH INTERVAL (FEET)	SAMPLE TYPE	LITHOLOGY DESCRIPTION	ANALYTICAL SAMPLE ID AND INTERVAL
0.0 - 2.0	FILL	FILL: Fragments of brick and glass, broken concrete with rebar; SOIL: Silty sand with gravel and boulders, SM COLOR: Brown to Dark Brown (10YR4/3)	TP-81-A, 0.0 - 0.5 Ft
2.0 - 4.0	NATURAL	SOIL: Sandy silt and boulders, ML COLOR: Brownish Yellow (10YR6/6)	TP-81-B, 1.5 - 2.0 Ft TP-81-C, 3.0 - 3.5 Ft

TEST PIT LOG

TEST PIT ID: TP-82 CLIENT: L.E. Carpenter and Company
 SITE: Wharton Facility LOCATION: Wharton, New Jersey
 LOGGED BY: ROY F. WESTON, INC. SAMPLE METHOD: Grab
 DATE LOGGED: 28 August 1990 DEPTH TO WATER: 3.17 Feet
 GEOLOGIST: John N. Dougherty TOTAL DEPTH: 4 Feet

COMMENTS: Former starch drying bed area, AEC-A

DEPTH INTERVAL (FEET)	SAMPLE TYPE	LITHOLOGY DESCRIPTION	ANALYTICAL SAMPLE ID AND INTERVAL
0.0 - 2.0	FILL	FILL: Small fragments of glass; SOIL: Silty Sand with gravel and boulders, SM COLOR: Very Dark Grayish Brown (10YR3/2)	TP-82-A, 0.0 - 0.5 Ft
2.0 - 4.0	NATURAL	SOIL: Silty Sand with gravel and boulders, SM COLOR: Very Dark Grayish Brown (10YR3/2)	TP-82-B, 1.5 - 2.0 Ft TP-82-C, 3.0 - 3.5 Ft

TEST PIT LOG

TEST PIT ID: TP-83 CLIENT: L.E. Carpenter and Company
 SITE: Wharton Facility LOCATION: Wharton, New Jersey
 LOGGED BY: ROY F. WESTON, INC. SAMPLE METHOD: Grab
 DATE LOGGED: 28 August 1990 DEPTH TO WATER: 3 Feet
 GEOLOGIST: John N. Dougherty TOTAL DEPTH: 3 Feet

COMMENTS: Former surface impoundment area, AEC-B
 Oil like sheen of water in bottom of test pit, strong petroleum
 hydrocarbon like odor from sediment in pit.

DEPTH INTERVAL (FEET)	SAMPLE TYPE	LITHOLOGY DESCRIPTION	ANALYTICAL SAMPLE ID AND INTERVAL
0.0 - 3.0	NATURAL	SOIL: Silt with occasional cobbles in interval from 0 to 1.5 feet, SM COLOR: Very Dark Gray (5Y3/1)	TP-83-A, 0.0 - 0.5 Ft TP-83-B, 2.0 - 2.5 Ft

TEST PIT LOG

TEST PIT ID: TP-84 CLIENT: L.E. Carpenter and Company
 SITE: Wharton Facility LOCATION: Wharton, New Jersey
 LOGGED BY: ROY F. WESTON, INC. SAMPLE METHOD: Grab
 DATE LOGGED: 27 August 1990 DEPTH TO WATER: 4 Feet
 GEOLOGIST: John N. Dougherty TOTAL DEPTH: 4 Feet

COMMENTS: Former surface impoundment area, AEC-B
 Oil like sheen of water in bottom of test pit, strong petroleum
 hydrocarbon like odor from sediment at a depth of 3 to 3.5 feet in test pit.

DEPTH INTERVAL (FEET)	SAMPLE TYPE	LITHOLOGY DESCRIPTION	ANALYTICAL SAMPLE ID AND INTERVAL
0.0 - 1.5	NATURAL	SOIL: Sandy lean clay with boulders from 1 to 1.5 feet, CL COLOR: Dark Brown (10YR3/3)	TP-84-A, 0.0 - 0.5 Ft
1.5 - 2.92	NATURAL	SOIL: Silt with boulders, ML COLOR: Very Dark Grayish Brown (10YR3/2)	TP-84-B, 2.0 - 2.5 Ft
2.92 - 3.5	NATURAL	SOIL: Elastic silt with boulders, MH COLOR: Dark Yellowish Brown (10YR3/4) and Light Olive Gray (5Y6/2), variegated	TP-84-C, 3.0 - 3.5 Ft

TEST PIT LOG

TEST PIT ID:	TP-85	CLIENT:	L.E. Carpenter and Company
SITE:	Wharton Facility	LOCATION:	Wharton, New Jersey
LOGGED BY:	ROY F. WESTON, INC.	SAMPLE METHOD:	Grab
DATE LOGGED:	28 August 1990	DEPTH TO WATER:	3.5 Feet
GEOLOGIST:	John N. Dougherty	TOTAL DEPTH:	3.5 Feet

COMMENTS: Former surface impoundment area, AEC-B

DEPTH INTERVAL (FEET)	SAMPLE TYPE	LITHOLOGY DESCRIPTION	ANALYTICAL SAMPLE ID AND INTERVAL
0.0 - 1.5	NATURAL	SOIL: Lean clay with sand, CL COLOR: Dark Brown (10YR3/3)	TP-85-A, 0.0 - 0.5 Ft
1.5 - 3.5	NATURAL	SOIL: Silt with boulders, ML COLOR: Dark Olive Gray (5Y3/2)	TP-85-B, 2.0 - 2.5 Ft TP-85-C, 2.5 - 3.0 Ft

TEST PIT LOG

TEST PIT ID: TP-86 CLIENT: L.E. Carpenter and Company
 SITE: Wharton Facility LOCATION: Wharton, New Jersey
 LOGGED BY: ROY F. WESTON, INC. SAMPLE METHOD: Grab
 DATE LOGGED: 28 August 1990 DEPTH TO WATER: 4 Feet
 GEOLOGIST: John N. Dougherty TOTAL DEPTH: 4 Feet

COMMENTS: Former surface impoundment area, AEC-B
 Petroleum hydrocarbon like odor from 1.5 to 4 feet.

DEPTH INTERVAL (FEET)	SAMPLE TYPE	LITHOLOGY DESCRIPTION	ANALYTICAL SAMPLE ID AND INTERVAL
0.0 - 1.5	NATURAL	SOIL: Silt with sand, ML COLOR: Dark Brown (10YR3/3)	TP-86-A, 0.0 - 0.5 Ft
1.5 - 4.0	NATURAL	SOIL: Elastic Silt, MH, filling voids between clast supported boulders COLOR: Dark Gray (2.5YN4)	TP-86-B, 1.5 - 2.0 Ft TP-86-C, 3.5 - 4.0 Ft

TEST PIT LOG

TEST PIT ID: TP-87 CLIENT: L.E. Carpenter and Company
 SITE: Wharton Facility LOCATION: Wharton, New Jersey
 LOGGED BY: ROY F. WESTON, INC. SAMPLE METHOD: Grab
 DATE LOGGED: 28 August 1990 DEPTH TO WATER: 2.25 Feet
 GEOLOGIST: John N. Dougherty TOTAL DEPTH: 3 Feet

COMMENTS: Former surface impoundment area, AEC-B

DEPTH INTERVAL (FEET)	SAMPLE TYPE	LITHOLOGY DESCRIPTION	ANALYTICAL SAMPLE ID AND INTERVAL
0.0 - 1.0	FILL	SOIL: Silty sand, SM, with boulders and telephone pole sections COLOR: Very Dark Grayish Brown (10YR3/2)	TP-87-A, 0.0 - 0.5 Ft
1.0 - 3.0	NATURAL	SOIL: Silty sand, SM, with boulders COLOR: Very Dark Grayish Brown (10YR3/2)	TP-87-B, 1.5 - 2.0 Ft

TEST PIT LOG

TEST PIT ID:	TP-88	CLIENT:	L.E. Carpenter and Company
SITE:	Wharton Facility	LOCATION:	Wharton, New Jersey
LOGGED BY:	ROY F. WESTON, INC.	SAMPLE METHOD:	Grab
DATE LOGGED:	28 August 1990	DEPTH TO WATER:	3.5 Feet
GEOLOGIST:	John N. Dougherty	TOTAL DEPTH:	4 Feet

COMMENTS: Former surface impoundment area, AEC-B
 Observed a brown liquid draining into test pit at a depth of about 3.5 feet.
 The liquid appeared to float on the water in the test pit and not to mix with the water.

DEPTH INTERVAL (FEET)	SAMPLE TYPE	LITHOLOGY DESCRIPTION	ANALYTICAL SAMPLE ID AND INTERVAL
0.0 - 0.5	NATURAL	SOIL: Silty sand, SM COLOR: Very Dark Grayish Brown (10YR3/2)	TP-88-A, 0.0 - 0.5 Ft
0.5 - 3.0	NATURAL	SOIL: Lean clay, CL, filling voids between clast supported boulders. COLOR: Gray (5Y5/1)	TP-88-B, 2.5 - 3.0 Ft

TEST PIT LOG

TEST PIT ID: TP-89 CLIENT: L.E. Carpenter and Company
 SITE: Wharton Facility LOCATION: Wharton, New Jersey
 LOGGED BY: ROY F. WESTON, INC. SAMPLE METHOD: Grab
 DATE LOGGED: 28 August 1990 DEPTH TO WATER: 1.25 Feet
 GEOLOGIST: John N. Dougherty TOTAL DEPTH: 2.0 Feet

COMMENTS: End of abandoned sewer pipe, AEC-E

DEPTH INTERVAL (FEET)	SAMPLE TYPE	LITHOLOGY DESCRIPTION	ANALYTICAL SAMPLE ID AND INTERVAL
0.0 - 1.5	NATURAL	SOIL: Silty sand, SM, with abundant rootlets COLOR: Very Dark Gray (2.5YN3)	TP-89-A, 0.7 - 1.2 Ft

LEGEND

- PROPERTY LINE
- TEST PIT LOCATION
- HAND AUGER SAMPLE LOCATION
- SURFACE WATER(SW)/STEAM SEDIMENT(SS) SAMPLE LOCATION
- DUPLICATE RESULTS IN BRACKETS

REMEDIAL INVESTIGATION SOIL SAMPLE RESULTS

TOTAL VOLATILE ORGANICS >1,000 ppb
 TOTAL BASE NEUTRALS >10,000 ppb
 TOTAL PCB'S >1,000 ppb
 TPH >100 ppm

NT NOT TESTED

SUPPLEMENTAL SOIL SAMPLING RESULTS

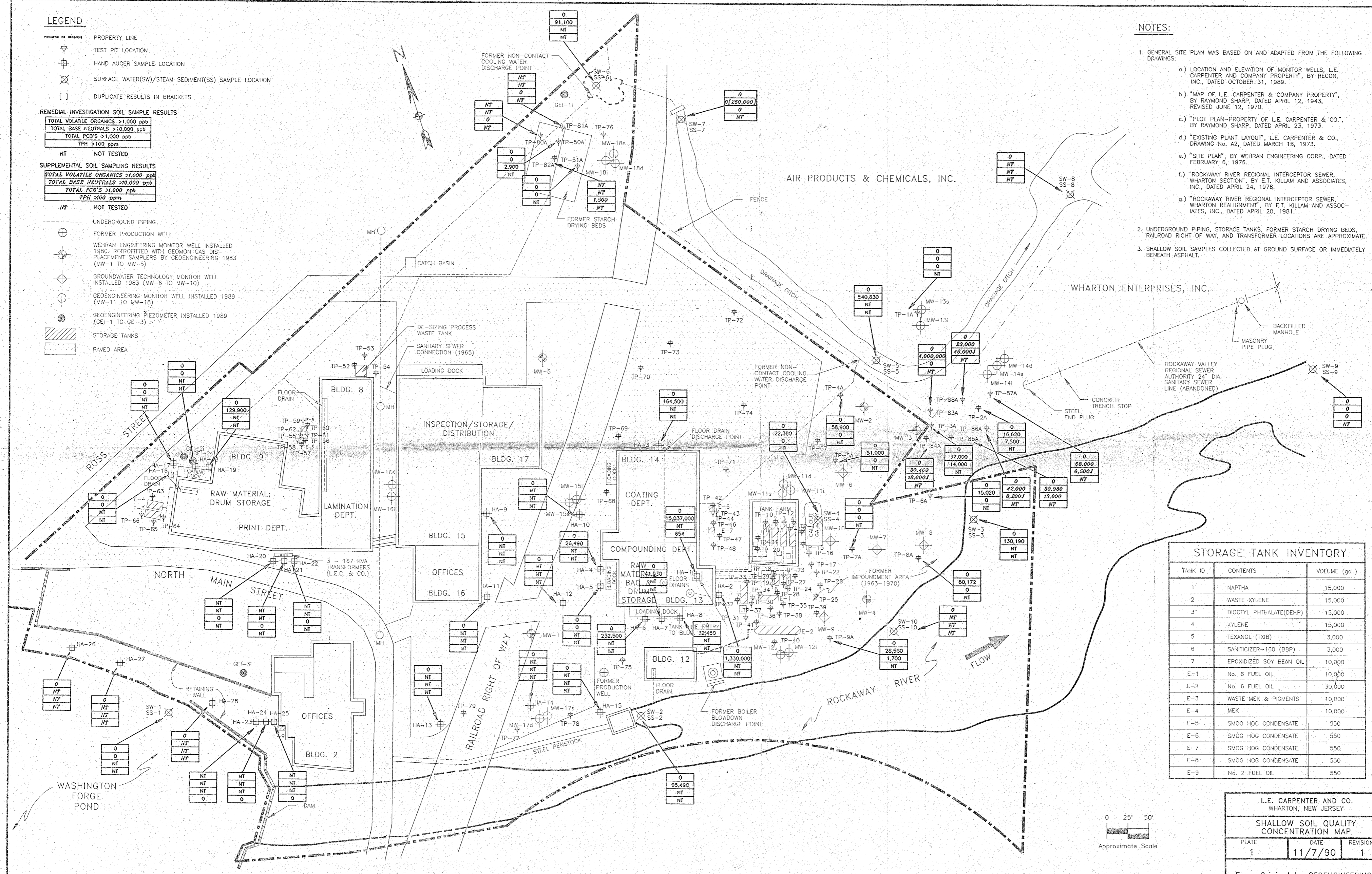
TOTAL VOLATILE ORGANICS >1,000 ppb
 TOTAL BASE NEUTRALS >10,000 ppb
 TOTAL PCB'S >1,000 ppb
 TPH >100 ppm

NT NOT TESTED

- UNDERGROUND PIPING
- FORMER PRODUCTION WELL
- WEHRAN ENGINEERING MONITOR WELL INSTALLED 1980, RETROFITTED WITH GEOMON GAS DIS-PLACEMENT SAMPLERS BY GEOENGINEERING 1983 (MW-1 TO MW-5)
- GROUNDWATER TECHNOLOGY MONITOR WELL INSTALLED 1983 (MW-6 TO MW-10)
- GEOENGINEERING MONITOR WELL INSTALLED 1989 (MW-11 TO MW-18)
- GEOENGINEERING PIEZOMETER INSTALLED 1989 (GEI-1 TO GEI-3)
- STORAGE TANKS
- PAVED AREA

NOTES:

- GENERAL SITE PLAN WAS BASED ON AND ADAPTED FROM THE FOLLOWING DRAWINGS:
 - LOCATION AND ELEVATION OF MONITOR WELLS, L.E. CARPENTER AND COMPANY PROPERTY, BY RECON, INC., DATED OCTOBER 31, 1989.
 - "MAP OF L.E. CARPENTER & COMPANY PROPERTY", BY RAYMOND SHARP, DATED APRIL 12, 1943, REVISED JUNE 12, 1970.
 - "PLOT PLAN-PROPERTY OF L.E. CARPENTER & CO.", BY RAYMOND SHARP, DATED APRIL 23, 1973.
 - "EXISTING PLANT LAYOUT", L.E. CARPENTER & CO., DRAWING No. A2, DATED MARCH 15, 1973.
 - "SITE PLAN", BY WEHRAN ENGINEERING CORP., DATED FEBRUARY 6, 1976.
 - "ROCKAWAY RIVER REGIONAL INTERCEPTOR SEWER, WHARTON SECTION", BY E.T. KILLAM AND ASSOCIATES, INC., DATED APRIL 24, 1978.
 - "ROCKAWAY RIVER REGIONAL INTERCEPTOR SEWER, WHARTON REALIGNMENT", BY E.T. KILLAM AND ASSOCIATES, INC., DATED APRIL 20, 1981.
- UNDERGROUND PIPING, STORAGE TANKS, FORMER STARCH DRYING BEDS, RAILROAD RIGHT OF WAY, AND TRANSFORMER LOCATIONS ARE APPROXIMATE.
- SHALLOW SOIL SAMPLES COLLECTED AT GROUND SURFACE OR IMMEDIATELY BENEATH ASPHALT.



STORAGE TANK INVENTORY

TANK ID	CONTENTS	VOLUME (gal.)
1	NAPHA	15,000
2	WASTE XYLENE	15,000
3	DIOCTYL PHTHALATE(DEHP)	15,000
4	XYLENE	15,000
5	TEXANOL (TXIB)	3,000
6	SANITICIZER-160 (BBP)	3,000
7	EPOXIDIZED SOY BEAN OIL	10,000
E-1	No. 6 FUEL OIL	10,000
E-2	No. 6 FUEL OIL	30,000
E-3	WASTE MEK & PIGMENTS	10,000
E-4	MEK	10,000
E-5	SMOG HOG CONDENSATE	550
E-6	SMOG HOG CONDENSATE	550
E-7	SMOG HOG CONDENSATE	550
E-8	SMOG HOG CONDENSATE	550
E-9	No. 2 FUEL OIL	550

L.E. CARPENTER AND CO.
 WHARTON, NEW JERSEY

SHALLOW SOIL QUALITY CONCENTRATION MAP

PLATE	DATE	REVISION
1	11/7/90	1

From Original by GEOENGINEERING

Plotted 11/7/90

